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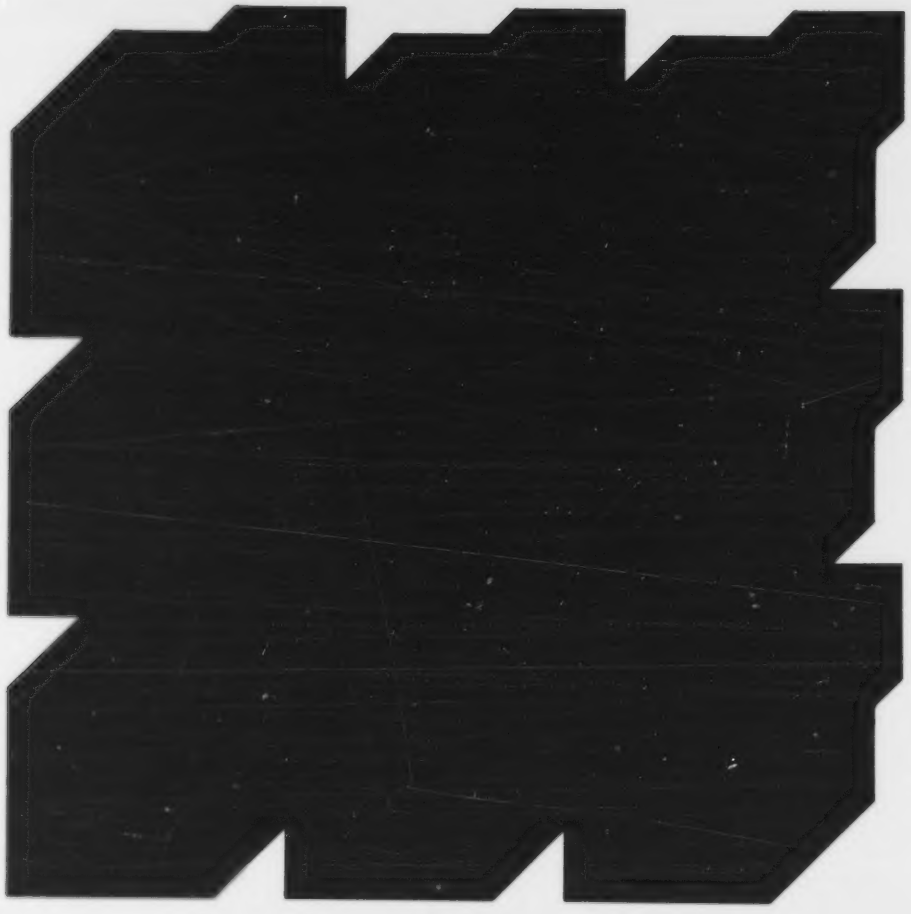

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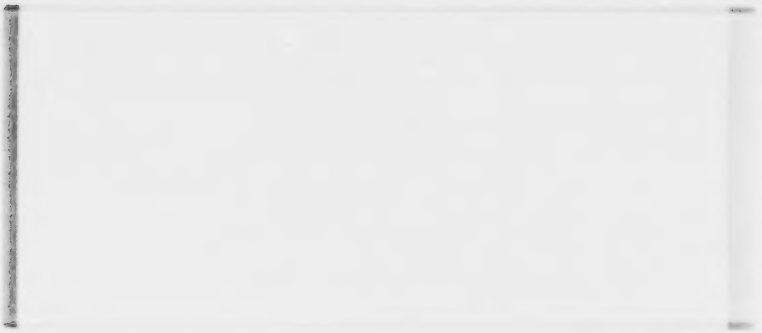

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DISCUSSION PAPER NO. 342

The Declining Middle and Technological Change: Trends in the Distribution of Employment Income in Canada, 1971-84

by

Norm Leckie

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RÉSUMÉ

Le but principal de ce document est d'évaluer l'opinion exprimée pour la première fois par Bob Kuttner dans le numéro de juillet 1983 de la revue Atlantic selon laquelle le progrès technologique conduirait à un déclin de la classe moyenne. Il soutenait que les nouvelles technologies créent, à la fois, des emplois bien rémunérés et exigeant de hautes qualifications, et des emplois faiblement rémunérés et peu exigeants au plan des qualifications, dépeuplant ainsi le niveau moyen des revenus et des compétences. Le problème est encore aggravé par ce qu'on a appelé le phénomène de désindustrialisation, c'est-à-dire le processus selon lequel les emplois bien rémunérés dans le secteur de la fabrication sont en voie de diminution, tandis que les emplois dans le secteur des services, présumément moins rémunérés et exigeant moins de compétence, sont à la hausse. De plus, l'évolution de la structure démographique -- en particulier l'afflux de jeunes et de femmes dont les salaires sont moins élevés et qui occupent un plus grand nombre d'emplois à temps partiel -- a contribué à une plus grande polarisation des revenus. Par des méthodes de standardisation, l'auteur de ce document cherche à isoler et à mesurer les effets de ces divers changements sur la taille de la classe moyenne et sur les autres mesures de la disparité des revenus. Il a mis l'accent sur le progrès technologique, ce qui l'a amené à choisir le revenu d'emploi comme objet d'analyse.

Voici les principales constatations de sa recherche :

i Malgré de fortes fluctuations conjoncturelles et d'importants changements dans la structure démographique et économique, la répartition des revenus semble n'avoir que très peu évolué au cours des 20 dernières années. On peut donc supposer que les diverses forces qui influent sur la répartition s'annulent mutuellement.

ii C'est cette présomption qui a incité l'auteur à adopter, pour le présent document, une démarche globale. Contrairement aux initiatives antérieures qui souvent étaient concentrées sur un ou deux facteurs, ce document couvre un certain nombre de variables démographiques, industrielles et professionnelles pertinentes. Il a recours également à diverses mesures de la classe moyenne et de la disparité des revenus.

iii Une constatation digne de mention, le nombre croissant de femmes et de travailleurs à temps partiel dans la population active a contribué à éroder la classe moyenne.

iv Cependant, bien que plusieurs des tenants de la thèse du déclin de la classe moyenne soient d'avis contraire, l'analyse empirique a démontré que ni le déplacement de l'emploi de la production de biens à la production de services, ni le progrès technologique -- mesuré ici par l'évolution des professions aussi bien que par le degré d'utilisation de facteurs de haute technologie -- n'ont réduit la taille de la classe moyenne. Cette constatation donne à penser qu'il ne sera pas nécessaire d'influer sur la structure industrielle de l'économie, ni de ralentir le progrès technologique pour préserver les emplois rattachés à la classe moyenne.

v Toutefois, bien qu'il soit devenu apparent que les déplacements sectoriels ne contribuent pas dans l'ensemble à réduire la classe moyenne, l'examen d'un certain nombre de cas de fermetures d'usines a mis à jour des situations où des travailleurs, après avoir perdu des emplois bien rémunérés dans la fabrication, ont souvent été contraints d'accepter des emplois moins bien rémunérés dans le secteur des services. Dans le cas de ces travailleurs, comme il s'était produit une baisse du niveau de vie, des politiques d'adaptation sous forme d'aide à la formation sont devenues nécessaires.

ABSTRACT

The primary goal of this paper was to assess the view first introduced by Bob Kuttner in the July 1983 Atlantic that technological change was leading to a declining middle class. He contended that the new technologies create both higher-skilled, better paid jobs and lower-skilled, poorly paid jobs while depleting mid-level incomes and skills. Exacerbating this problem was the so-called de-industrialization phenomenon, a process involving employment shifts from the better-paid manufacturing sector to the allegedly lower-skilled, lower wage service sector. Also, changes in the demographic structure -- particularly the influx of low-paid youth and women and the greater utilization of part-time employment -- were contributing to greater income polarization. Through standardization techniques, this paper seeks to disentangle and gauge the impact of these various changes on the size of the middle class and other measures of income disparity. The accent on technological change led to the choice of employment income as the object of analysis.

Among the main findings of the analysis were:

i Despite dramatic swings in the economy and shifts in the demographic and economic structure, the distribution of income appears to have changed very little over the last 20 years or so. This suggests that the various forces impinging upon the distribution have acted to offset one another.

ii This suggestion prompted the comprehensive approach taken in this paper. Unlike previous efforts which often concentrated on one or two factors, the present paper covers a number of relevant demographic, industrial and occupational variables. It also makes use of a number of different measures of the middle class and income equality.

iii A finding of note was that the growing number of women and part-time workers in the work force have tended to erode the middle class.

iv Contrary to what many of the declining middle proponents have been saying, however, the empirical analysis found that neither the shift in employment from goods- to service-producers nor changes in technology -- measured here by occupational shifts as well as the degree of utilization of high-tech inputs -- have reduced the size of the middle class. This finding would appear to obviate

the need to influence the industrial structure of the economy or dampen technological change per se in order to preserve middle class jobs.

v However, while it was found that sectoral shifts were not shrinking the middle class overall, a review of a number of cases of plant closings revealed situations where workers, displaced from well-paid manufacturing employment, were often forced into service jobs that paid them less than before. For such workers, who have undergone a decline in living standards, adjustment policies in the form of training assistance were thus deemed necessary.

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FOREWORD

This paper forms a part of a larger project examining the impact of technological change on the labour market. That research culminated in July 1987 in the publication of Innovation and Jobs. The material in this paper provides technical background to, as well as an update of, Chapter 5 of that research report.

Much of the uneasiness about technological change concerns the number of jobs being destroyed and created by the introduction of new technologies. But concern has also been expressed about the distributional impacts of technological change along with the quality of jobs being created. This paper aims to address the issue of income polarization and, in doing so, allays some of the fears. It finds that from the early 1970s to the mid 1980s there was considerable stability in the distribution of employment income. Moreover, changes in technology and the occupational and industrial structure appeared to have had little impact on the size of the middle class.

The author, Norman Leckie, is a senior economist at the Economic Council of Canada, where he has been involved in the study of a number of labour market issues. Currently, he is a member of the research group Employment and the Service Economy at the Council.

Judith Maxwell
Chairman

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1 INTRODUCTION

There is a widespread popular belief that the distribution of skills and income can no longer be represented by the traditional bell-curve.[1] Numerous observers contend that skills and incomes are gravitating towards the upper and lower ends of the distribution. Thus it is claimed that the distribution is increasingly "bimodal," and concerns are expressed that the middle class -- the traditional source of economic and social stability -- is being eroded. Furthermore, while a number of factors are seen to be at work, technological change is frequently cited as a cause of the "declining middle." In the most popular version of the story a new feudalism is created, with a "techno-nobility" that owns and controls the new technologies and a "techno-peasantry" that tends and serves them.[2] But, while there is a great deal of interest and concern, there are few studies of a comprehensive and empirical nature and most of these are American. This paper aims to examine the question of the declining middle in Canada.

Concern over a declining middle class appears to be as strong as it was four years ago when the original idea was introduced to the popular press by Robert Kuttner (1983). The reasons why this issue continues to attract a lot of attention are political and social, as well as economic. For example, the disappearance of mid-level job opportunities would mean that workers at the

entry-level in a variety of jobs might no longer enjoy the prospects of continuous advancement over smooth life-time career paths. Meanwhile, business is also worried by a shrinking middle class. Traditionally, establishments have done well by gearing their product/service line to one large segment of the population, namely the middle class. With the erosion of that market, firms -- especially those in retail -- will be forced to restructure their businesses to cater to the divergent tastes of one or the other wealth extremes of society. Society as a whole and government in particular should also be worried by the prospect of a smaller middle class, since the large middle class has traditionally defined the nation's goals and identities. And without a large middle class buffer between the rich and poor, the spectre of social unrest must be contemplated.

If there is some decline in the middle class, it is important to determine why it has occurred in order to give policy makers some direction as to what, if anything, to do about it. For instance, if it can be shown that the changing demographic structure has been contributing to a decline in the middle class, say by expanding the number of low-skilled young entrants, then the appropriate policy response may simply be to do nothing more than to wait till the young workers mature and gain experience: the problem is transitory. Of course, if such a shift were part of a secular trend, then specific government assistance would be necessary. Similarly, if the shrinking middle class can be

attributed to the changing occupational/industrial mix and technological change, then greater attention should be paid to training policies and how the new technologies are being applied.

In this paper the focus will be on the distribution of individual employment income, since it is more directly sensitive to labour market forces, specifically, technological change, which is the subject of the overall study of which this paper forms a part.[3] Other studies -- reviewed in this paper -- have been concerned with the lot of total family incomes and have thus introduced family compositional variables such as the rising divorce rate, the growing number of two-earner families and the falling rate of family formation, factors which will not be of direct relevance to the present paper.

Indeed, the distribution of income is determined by a number of different factors. As the data will attest, however, the overall distribution has remained remarkably stable since the early 1970s despite sharp swings in the economy, rapid technological advance and rising numbers of youth and females in the labour market. It is clear, then, that the impact of these changes on the distribution of income was such that they offset one another. What is not clear is what the direction of the impact of each of these factors was. For example, what was technology's role in this process? Did it have a negative influence on income inequality, and, if so, did some other change in the economy

counteract its impact? It will be the purpose of this paper to gauge and sort out the contribution of the various factors to the income distribution, based on a technique known as standardization.

Closely allied with the notion of the declining middle are issues of "income skidding" and skill polarization/deskilling, which will be briefly dealt with in this paper. The former is the process by which workers are forced out of existing jobs by industrial restructuring or technological change and into jobs which pay them less than before. Whether or not such changes taken together contribute to an overall decline in the middle class, it is clear that the affected workers have been forced to take cuts in pay, which will undoubtedly cause them some hardship. A related concern is that the distribution of skills may also become increasingly polarized along with the income distribution. First, the introduction of advanced automation systems have the potential to deskill and devalue the jobs of certain skilled blue-collar and mid-level white-collar workers. At the same time, computerization requires highly skilled workers to design and program the new technologies. The result, it is contended, will be a bi-modal skill distribution.

The first part of this paper will be devoted to a discussion of the relevant literature, including the diverging views on what have been the chief causes of middle class decline and how to

measure that decline. Next, we will outline our approach to analysing the issue and provide a description of the data set and methodologies employed. The results of the analysis are contained in the next section. There is a concluding section in which a number of policy responses are suggested.

NOTES TO CHAPTER 1

1 Probably the most influential article has been Robert Kuttner's "The declining middle," in the Atlantic Monthly, July 1983, pp. 60-72. Canadian articles which sounded the alarm, though chiefly in an anecdotal fashion, include Gessell (1985), Shifrin (1986), Goldstein (1986), and Steed (1986).

2 It was the Globe and Mail in a series of articles entitled "The techno-peasants" (January 3-7, 1984) that identified certain segments of the population particularly hard hit by the new technologies.

3 See Innovation and Jobs, Economic Council of Canada (1987), particularly Chapter 5.

2 THE DEBATE

The literature on the relatively new subject of the declining middle is already extensive, though diverse. As a way of organizing the presentation, there are two convenient ways of viewing work in this area: political and economic. Along the political dimension, the literature can fairly neatly be divided into two camps. On the one hand, there are the non-interventionists who believe that the problem of a shrinking middle class is largely transitory, arising out of the dramatic demographic shifts that have recently occurred. These changes have led to a merely temporary aberration in the distribution of income, which does not require remedial action on the part of government. On the other side of the debate is a more interventionist group of labour market analysts who attribute the disappearing middle to industrial and technological restructuring, as well as to the diminishing significance of social programs and unions. This group advocates improved industrial and social policy as the solution to the problem.

Another convenient way of viewing the literature is to consider what income type is the object of analysis. Along this economic dimension there are, again, two groups of observers, but this time on opposite sides of the market place. Supply side writers/researchers have looked at total income across families.

Typically, such observers have concentrated on changes in the demographic and family structure, such as the growing number of female labour market entrants, two-earner families, single-parent families, unmarried individuals, young workers and older workers. Facing this group is a group of observers interested in mainly demand-side factors, such as occupational and industrial shifts, as they influence the distribution of employment income of individuals. In the ensuing discussion we will look at these two groups in turn.

TOTAL FAMILY INCOME

First, Thurow (1984), Steinberg (1983) and others have argued that, because equals attract equals, with doctors marrying doctors and personal service workers marrying personal service workers, the trend towards two-earner families has depleted the ranks of the middle class. But Levitan and Carlson (1984) cite a study that shows that working wives tend to be an equalizing force, while Blackburn and Bloom (1985) provide evidence that the growth of two-earner families has helped raise family incomes into the upper class. Finally, Bradbury (1986) shows that the increased labour force participation of women has actually helped to increase the size of the middle class, a finding Levy (1987) supports.

Another phenomenon that Belous, et al. (1984), Thurow (1987), Levy (1987), and Levitan and Carlson (1984) contend is polarizing family incomes is the rising divorce rate. The growing number of marriage break-ups has led to large numbers of families that are being headed by a female single parent who typically is without labour market skills and thus without large remuneration. Thus, amongst family units, this trend may have contributed to a larger lower income class.

The changing age structure of the population has also contributed to growing inequality, in a number of ways. For one thing, as Bradbury, Blackburn and Bloom (1985), and Levitan and Carlson have pointed out, members of the post-war baby boom have been less inclined to form families, with the result that there are a greater number of unattached individuals (families of one). Obviously, singles earn less than families, thus leading to a large lower-income class among family units. Still, as Levy points out, in comparing just families per se, the rising age of first marriage probably increases equality by reducing the number of young, low-income families. At any rate, Blackburn and Bloom indicate that this is a pattern that may go away as baby boomers now appear to be marrying in record numbers.

By their sheer numbers, the baby boomers have also purportedly led to a burgeoning lower class, an argument applicable to the large influx of female labour market entrants as well. But, as

they mature and acquire skills and experience while they proceed along their career path, they will expand the ranks of the middle class. So, for a number of observers the "problem" is transitory. Other researchers, however, do not accept this argument of large cohorts. Bradbury and Thurow (1984) point out that the diminishing middle class is not unique to any particular age bracket. Moreover, they ask, why should the problem disappear simply when the baby boomers reach middle age, at which time they will just have to undergo as much competition for jobs as they did upon entry?

One comprehensive effort that has dealt with the impact of a number of "social" changes on the distribution of total family income in Canada was carried out by Wolfson (1986b). Using rigorous empirical techniques (more of which later), he found that reduced marriage rates, lower fertility rates, increased female participation, and increased family break-ups have all contributed negatively to income equality. The fact that the overall distribution of income remained stable despite these changes was explained by macro-economic changes such as rising unemployment, which set into operation automatic redistributive mechanisms like unemployment insurance and other government transfers, and rapid inflation/high interest rates, which benefited the elderly among whom there was a large concentration of savings.

As for the role played by the economy itself in the determination of income equality, a number of observers have offered their viewpoint. Contrary to the view cited above -- that recessions may be equalizing -- Samuelson (1983), Blackburn and Bloom (1985), and Belous, et al. maintain that a depressed economy expands the lower class ranks of the income distribution since it deprives families of an important source of income, that is, employment. We should also say that the impact of recessions may not be even across all occupations, as a sluggish economy tends to depress the wages of hourly rated workers through layoffs and short-time, but leave salaried workers relatively unscathed. Levy agrees that recessions have penalized many workers by preventing their wages from keeping up with prices but goes on to point out that inflation may benefit the elderly through indexed pensions. Therefore, he concludes, the economy is not changing the size of the middle class, just its composition and its earning power.

This leads us to the impact of social and fiscal policy on the distribution of income. As Kuttner and others have said, the declining public sector, through de-regulation, has led to a loss of better paying jobs, thus contributing, to some extent, to a declining middle. Moreover, in the United States, as Belous, et al., Ehrenreich (1986), Levitan and Carlson, and Bradbury assert, present public policy, which seemingly favours the better off by reducing their taxes and disadvantages the poor by reducing social spending, has contributed to a polarization of family incomes,

especially disposable incomes. However, Thurow (1987) refutes this argument, though with no real empirical justification, saying that social-welfare cutbacks in the United States have not appreciably expanded the poverty roll there, while the tax system is no more regressive now than it was in 1980. Moreover, a social policy that has granted generous unemployment insurance coverage and indexed pension plans has, undoubtedly, prevented many from falling into the lower class.

This brings us to the question of whether or not the income measure to be used in the analysis is before tax or after tax, because, depending on the degree of tax proportionality, including or excluding taxes may increase or decrease inequality. Another complication is that all measures of income exclude non-cash income benefits, particularly in the area of health, which, in the United States, have an equalizing effect on the distribution of income since they benefit the poor for the most part. In Canada medicare is universal -- thus favouring no particular income group.

EMPLOYMENT INCOME

Till now, the discussion has dealt with the total income package at the family level, which is affected by a myriad of forces such as the changing demographic structure, changing tax and social policy and changes in family composition brought about by changing attitudes about family formation and divorce. An important

element of the total income package is employment income, which a number of declining middle observers have focused on. This introduces a further set of mainly economic factors which we will now look at, though it should be noted that the changing age and sex composition is an important variable here as well.

Kuttner's original declining middle thesis dealt primarily with the impact of the interrelated factors of de-industrialization, technological change, international competition and de-unionization, as well as the declining influence of the public sector on the earnings distribution. It was his largely unsubstantiated view, along with Thurow's (1984) and Steinberg's, that the shift in emphasis from manufacturing to the service sector has contributed to a declining middle class. According to the authors, this is because the former is a large source of traditionally well-paying middle-class jobs, while in the latter there is a concentration of both better- and lower-than-average-wage jobs. Among the reasons for this change in the industrial mix are changes in consumer tastes and standard of living that favour services; the recession, because manufacturing is more cyclically sensitive than services (Belous, et al.); and technological/productivity changes, because technologies in the service sector appear to be more labour-using than those in the goods-producing sector (Picot, 1987).

Much of the argument that de-industrialization is contributing to growing income inequality is based on anecdotal evidence and general perception. Everywhere, both in Canada and the United States, horror stories are told of plant closings that have forced skilled workers into low-skilled service jobs (see "Income Skidding" discussion below). But Lawrence and Rosenthal (1985), while accepting these (isolated) stories as fact, do not share the opinion that de-industrialization generally has eroded the middle. They set up their argument by posing the question: How typical are well-paid jobs in manufacturing and poor-paying jobs in services? Rather than relying on circumstantial evidence, they make use of empirical techniques (to be discussed later) to show that these jobs are not typical of their respective sectors.

First, Rosenthal finds that the decline in low-income manufacturing industries (like textiles and clothing) has more than offset the decline in middle-income industries (like automobiles and steel) and that the bi-polarization trend in services has reversed itself since the mid-1970s. Similarly, Lawrence demonstrates that, while there has been some middle-class decline, sectoral shifts have not been the cause: manufacturing's earnings distribution is no better than services'. For this reason he feels it would do no good to stem this evolutionary transition. In fact, he found that it was the large cohort of youth and, to a lesser extent, females that was skewing the income distribution -- a situation, he says, that will correct itself as

the former mature and the participation of the latter reaches a saturation point.

Blackburn and Bloom (1987) also considered the impact of sectoral shifts on earnings inequality. First, they found that indeed the share of full-time/full-year workers rose in three industries that have above-average earnings inequality, namely services, trade, and "other goods." However, based on decomposition analysis in which they broke the change in income dispersion down into the portions attributable to changes in employment shares, mean incomes and earnings inequality of industries, they concluded that employment shifts among sectors contributed very little to the small increases in earnings inequality.

Levitan and Carlson, however, ignored the de-industrialization argument and analysed earnings distribution data by a number of demographic variables. Their findings led to the conclusion that it was the changing age and sex structure -- along the lines discussed earlier regarding total income -- that was contributing to a declining middle. Moreover, the growing part-time element -- itself a reflection of the changing demographic and industrial mix -- was also a factor, because, of course, part-time workers earn less than their full-time counterparts -- thus leading to an expansion of the lower class, possibly at the expense of the middle. This is particularly true of those who are involuntarily

working part-time for economic/structural reasons and lack advancement opportunities. But, as Rosenthal points out, to the significant numbers of those who choose part-time -- possibly to increase total family income to a middle-class level -- the traditional declining middle arguments do not apply. Moreover, he found that weekly earnings among part-timers are distributed similarly to full-timers.

A number of authors, notably Kuttner, Thurow (1984) and Lawrence, have also identified de-unionization as a major cause of middle-class decline. For one thing, union influence is much weaker in the services than in the goods sector, thus perhaps contributing to the services-to-manufacturing shift of employment. But more directly, because unions have for so long served to raise and defend workers' wages, the general decline of unions in the United States has likely contributed to a cut in employment income there.

Another important variable in this sectoral shift of employment and thus the decline of the middle class is international competition. According to Kuttner, manufacturing's fall in importance can be partially attributed to "globalization," a process whereby large corporations are responding to foreign competition by transferring their domestic operations to countries with cheap labour, a flight that is surely aided by mobile production and information techniques. Alternatively, the

reaction to stiff foreign competition may simply be to engage in increased offshore contracting, which, Steinberg maintains, destroys good-paying, indigenous employment. Another aspect of the international competition question is the growing balance-of-trade deficit, especially in the United States. Thurow (1987) points out that, because American domestic export and import-competing industries have a more equitable distribution of earnings than the rest of the economy, a trade-induced slowdown in these (mostly manufacturing) industries contributes to growing inequality in the total economy.

The final point of discussion is the role purportedly played by technology in the declining middle process. The principal way technology affects workers and their earnings is via occupational skills; indeed, Kuttner's thesis hinges upon this fact. According to him, automation, while eliminating low-skilled, mundane and dangerous jobs, also has deskilled and downgraded the jobs of skilled blue-collar workers and mid-level white-collar workers. At the same time, the introduction of new technologies has placed a premium on specialists like engineers and scientists who design, program and implement the new equipment. The result of these occupational shifts will be a polarized distribution of incomes: a work force dominated by large groups of highly paid managers and professionals on the one hand and low-paid labourers and clerks on the other.[1]

Blackburn and Bloom (1987) have also dealt with the impact of technology on the income distribution in an interesting way. For these authors, from what side of the labour market tech change is assumed to affect the distribution is important, although the theory is poorly developed in this area. If changes in technology are assumed to operate from the demand side by changing the nature of jobs and by altering the relative importance of skilled and unskilled labour, then in a time of rapid technological advance -- such as we have just experienced -- earnings inequality should rise. Because it did not, the authors conclude that earnings is not the vehicle through which technological change affects income distribution, although they do admit that "inequality is influenced by many other economic and demographic forces as well" (p. 37). But the authors then go on to speculate that, if it is assumed that tech change operates mainly on the supply side through its impact on the labour/leisure choice (by altering family size through new contraceptive and fertility techniques, or by enabling and attracting more family members into the labour market), then family income inequality will rise as a reflection of technological change, independent of the movement of earnings inequality. Indeed, Blackburn and Bloom's figures show an increase in inequality in the distribution of total income across families, an outcome they find "consistent with the hypothesis that technological change has had positive supply side effects on income inequality" (p. 37). Both the above conclusions, however, are drawn on the basis of mere speculation about the impact of

technology on income distribution, with no empirical justification.

Still, a number of writers support the demand-side thesis, the contention of increasing skill polarization. Myles (1987), for one, draws on survey evidence to show that an accurate view of the emerging work force is one of a "dual labour market for job skills" (p. 17), although he does not necessarily attribute this new skill structure to technological change per se. One who does is Zachmann (1987), claiming that the new production techniques require highly qualified labour on the one hand and workers in occupations with low technological content on the other. He goes on to say that the former will enjoy both employment security and long hours, while the latter are in poorly protected and often part-time jobs. Lund and Hansen (1986) also discuss the skill distributional impacts of technological change. Based on their reading of past practices in the United States, the authors find that the introduction of computer-based technologies in manufacturing leads to skill polarization -- that is, a bimodal distribution of skills -- leaving few job opportunities in the middle. Kubicek (1985) shares the view that technology leads to the creation of a lot of low-skilled jobs (comprising either residual programmable tasks or "non-computerizable" tasks) and the emergence of a lesser number of new highly skilled jobs in the areas of planning, monitoring, and control. He reports the results of a synopsis of German studies of the impact of

automation on job skills that shows that in over one-half of administrative/service cases skill polarization or downgrading did occur; in industrial production cases, the figure was about 40 per cent.

But Kubicek also cites some criticism of polarization theory. For one thing, some have objected to its assumption of inevitability, saying human choice will produce other, more equitable work organizations in the event of the job dissatisfaction that would result from polarization. Other objections include the vagueness of the job skills concept of the theory; that one cannot judge new developments under old standards of skill and pay; and the fact that, despite individual hardship, technological change does raise the overall standard of living. The key is to re-orient the education system to produce properly trained workers where necessary. Indeed, Thurow (1987) sees technology as the answer to, and not the cause of, the surge in inequality taking place in the United States, which instead he attributes mainly to the fact that the United States is falling behind its foreign competition. Investment in research and equipment as well as education will increase domestic productivity, he advises, thus helping to stem the emigration of good-paying jobs. Similarly, Mahon (1987), in a comparative analysis of the experiences in the United States, Japan, West Germany, and Sweden, shows that technology need not lead to a polarization of skills and income by destroying the better-paying jobs. Under an industrial relations system which encourages

unions to participate in the organization of work and pay, the introduction of technology can, in fact, contribute to the generation of good jobs.

There have been a number of other refutations of the argument that technology is contributing to a declining middle. Lawrence cites his own calculations to show that high-technology sectors in the United States have predominantly fewer lower-class jobs and more middle-class jobs than do other sectors; the proportion of workers in "smokestack" industries (durable manufacturing) receiving middle-class earnings is actually lower. Similarly, Rosenthal shows empirically that the salary structure of high-tech industries is not bipolar: the proportion of employment in low-wage jobs in the high-tech sector is lower than that for all jobs, while production workers in high tech have hourly earnings higher than their counterparts in manufacturing. Further disproof of the technology/polarization connection is provided by Medoff and Strassman (1985) who show in a study of American computer manufacturers that earnings are no more skewed in high-tech companies than in all industries. Finally, Newton and Leckie (1987) use occupational employment income data from the Census of Canada to show some tendency towards upgrading of the job structure, a conclusion similar to the one drawn by Krulwich (1985) on the basis of comparable American data, though for the future.

Osberg (1988) pursues the technological question along slightly different lines. First, he divides the work force into four sectors according to the potential of the members' occupations for displacement from productivity-enhancing technologies. The first group is composed of goods-producing occupations where something is done to a thing (e.g., processing, machinery, fabricating, repairing, constructing) and which are characterized by productivity increases owing to capital investment; the second is the personal services group in which something is done to/for a person (e.g., food serving, guarding) and which are characterized by small increases in productivity because labour time is, in fact, the output; the third group is information production occupations which is subdivided into (i) data production, including compilation, storage and transmission (e.g., clerical) where there have been rapid production increases because of the falling cost of electronic computing/telecommunications equipment; and (ii) knowledge production (e.g., managers, scientists, engineers, teachers) in which there is no traceable tendency for productivity increases because of the requirement of human intervention, implying that such occupations are irreplaceable by machines.

Osberg does not expect the distribution of income to change appreciably despite the technology-induced movement of labour from goods occupations, which are relatively equitably distributed regarding income, to personal services, where the distribution is

less equitable. This is because there is a coincident flow of employment out of information production, where income is not equitably distributed, and into knowledge production where there is a fairly equal distribution of income. Thus, in one area of the economy, technology is contributing to income equality; in another area its impact is equilibrating to income distribution.

"INCOME SKIDDING"

Inextricably related to the debate over whether or not technology leads to income polarization by placing greater demand on higher- and lower-skilled jobs is the so-called "income skidding" phenomenon. This is the process by which workers in jobs subjected to successive skill downgrading and eventual elimination by technological and other forces are forced into employment offering lower pay than their original jobs. A typical anecdote concerns the skilled steel worker rendered redundant by technological change, now working as a hamburger flipper at a fast food outlet, and earning half of what he or she originally earned. Whether or not there are enough such instances of income-skidding to constitute, in net terms, a full-scale middle-class decline is really a moot point since, for these industrial "dislocatees," who are often workers without much education and skill training, change certainly has meant a drop in living standards and an increase in hardship.

Indeed, there is a small body of literature tracking the experiences of workers suffering a change-induced loss of jobs in a number of different sectors of the Canadian economy. Grayson (1986) for one, details the impact on workers of the closure of three plants involved, respectively, in the manufacture of bearings, heavy electrical generating equipment, and household appliances. In each case the closure resulted from a corporate strategy of (global) rationalization of production which was facilitated by the automation of production and the development of sophisticated computer linkages among the various corporate divisions -- in short, aided by technological change. And in each case a large proportion of the affected work force were unable to find another job. Of those who did find one, the majority ended up in jobs requiring less skill and commanding less pay.

Another Canadian example was documented at the 1985 Steel Trade Conference in a paper plotting the income and industry outcomes of workers forced out of the steel sector because of technological change, market shifts, and international competition. Allen (1985) found that, while two-thirds of those who left the steel industry found employment elsewhere, the average income of those new jobs was 3.5 per cent lower than the original steel jobs. Almost one-half of the ex-steel workers who found jobs did so in financial, commercial, business, personal, and public services -- where the nature of the work could differ quite substantially from that in the steel trades.

Similar results were arrived at in a study of the metal mining industry in Canada by the Canadian Occupational Projection System (EIC, 1986). That sector too was faced with international competition and the need to adopt new technologies and production processes. Using data obtained in the COPS/MAC Human Resources Survey, COPS found that metal mining suffered a net loss of some 18,000 jobs from 1981 to 1985, which represented over one-quarter of the original 1981 work force. The average wage of those who found employment elsewhere fell by almost one-quarter compared to their pre-separation wage. Moreover, well over one-half of the new jobs were found in the service sector, where the chances of finding similar employment are small and thus the task of adjustment large.

Finally, Picot and Wannell (1987) undertook a comprehensive, cross-industry study of workers confronted with permanent job loss between 1981 and 1984, based on a Statistics Canada Survey of Displaced Workers. Among its many findings was that those in construction, mining, and some parts of manufacturing (particularly textiles and clothing) were most likely to be laid off, while those in education, health, finance, and public administration were least likely. Moreover, those in the higher paid engineering, natural science, and administrative positions suffered the greatest job losses -- a possible reflection of employers' cost considerations during the recession period. Most full-time job losers who found full-time jobs earned more in their

new jobs; on the whole, however, such workers received less in total because those who lost, lost heavily. Those in higher wage jobs suffered, on average, the greatest percentage loss in earnings, while those in lower-income jobs actually gained -- a finding which does not support the declining-middle hypothesis, at least among job losers. However, a considerable proportion (43 per cent) of those losing full-time manufacturing jobs found a new one in services, where their aggregate wages were 14 per cent lower. Still, those who found a new job in the same sector (i.e., manufacturing) also experienced a wage cut, but of only 7 per cent.

It is obvious from the above that, whether or not there is a general trend towards inequality, there is a considerable number of (mainly manufacturing) workers who are suffering a decline in income as a result of job displacement. It appears, then, that it is this minority that is being asked to bear the brunt of the industrial restructuring presently taking place in the economy. While it may not be feasible to reverse employment losses in manufacturing, it would be reasonable to ask policy makers to provide training assistance to those dislocated workers.

NOTE TO CHAPTER 2

1 In point of fact, it was Braverman (1974) who introduced the notion that technological change tends to deskill the work force, leading to a "mass" of unskilled and semi-skilled workers serving a small elite of managers and "knowledge" workers. He did not make explicit mention of the impact of this process on incomes, which is our primary concern.

3 A NEW APPROACH: LESSONS FROM THE LITERATURE

What is apparent from the preceding literature review -- summarized in tabular form in the Appendix -- is that there is a general lack of consensus not only on whether there is a declining middle but also on what may be contributing to it. In this section, possible reasons for the disagreement are outlined along with the parameters of a new approach. Before doing so, it should also be pointed out that, apart from a handful of writers, the preceding has dealt with what has been happening in the United States. This analysis of course will be looking at the Canadian situation.

DEFINITION OF CLASS

One source of difficulty may lie in something as basic as the criteria used to judge "class." For, class is a nebulous, multi-faceted concept, based on personal perception and representing different things to different people, though ultimately it comes down to a question of "status." For some, it is defined by home ownership or the ability to afford conspicuous, materialistic possessions; for others, the relevant criterion is the level of education one has attained; for still others, how much one earns, the degree of control in the workplace (or, indeed, whether one even has to work) determines one's social position. Class is, in short, a state of mind. Besides there

being no clear-cut definition of what constitutes class, the above concepts are, for the most part, not quantifiable: the data just do not exist. For this reason, the present analysis relies on a traditional measure of class, and one for which there is a suitable amount of information available: that is, income. But, in so doing, it is recognized, of course, that income is but one aspect in a whole range of factors affecting social equality and economic well-being.

INCOME TYPE

Accepting income as an indicator of class, as most observers do, some of the disparity of opinion that remains is due simply to differences in the type of income being examined. Where the focus is on total family income, analysts have looked to such supply-side factors as family composition and other demographic variables as possible causal factors. If, however, it is the distribution of individual employment income that is under investigation, then the emphasis is on demand-related changes in industrial composition and technology, as well as demographic shifts. As Blackburn and Bloom (1987) have shown, the pattern of inequality in these two income types may not be the same, which explains why conclusions drawn on the basis of one or the other often differ. Nevertheless, because this paper forms a part of a larger effort examining the impact of technological change on the labour market and because it was felt that such change has an

important effect on skills and thus income, the object of the present analysis will be employment income of individuals who are working. It is the earnings structure where the real impact of technological and industrial change is being felt. Moreover, since employment remains the greatest single source of income, changes in the distribution of employment income are likely to affect overall income equality.

However, this is not to downplay the importance of changes in family formation and composition which, as demonstrated above, have certainly had a strong influence on the distribution of income. Moreover, as has been pointed out, the addition of new family members and the participation of additional members in the labour force may be related to technological change, the focus of the present analysis. At any rate, Wolfson, as outlined earlier, has effectively dealt with the impact of these supply-side factors on income distribution. Finally, it should be pointed out that the focus on the individual does not imply that his or her position in the labour market is an indicator of the social position of each member of the respective family.

UNIT OF TIME; EMPLOYMENT/SELF-EMPLOYMENT INCOME; TARGET POPULATION

Even if labour market income is accepted as the focus of analysis, results will often vary depending on the population that is the target of analysis. For instance, the earnings of wage and salary earners is more equitably distributed than the distribution of all earners, a group which comprises the employed and the self-employed including low-income corner store owners and high-income developers. Or, if in an effort to standardize for hours worked, the object of analysis is the distribution of just full-time/full-year workers, results based on this population would be different from analysis based on all workers, a group which includes low-income part-timers. Another way to control for hours, of course, is to use hourly earnings (Medoff and Strassman), which would likely yield quite different results from those based on annual earnings. The present analysis will be concerned with annual employment income of all working individuals: annual, because hours worked during the year may in part be a reflection of tech change; and all individuals, including the self-employed, because their growing numbers may in part be due to the action of tech change forcing them to start up their own businesses or contract themselves out.

MEASURES

Even within the different income categories, there appears to be no clear-cut consensus on what is happening to the middle class. Does a declining middle imply that the share of income accruing to the middle class has been falling? Or, does it mean that the size of the middle class itself has shrunk? To answer the first question, observers have relied on a quantile measure (e.g., quintiles), where they look at the middle ranks (e.g., middle three quintiles) of income earners ranked on their incomes. Others have concentrated more on the changing size of the middle class -- which quantile measures cannot capture. Therefore, to answer the second question posed above, researchers have made use of a measure based on the distance from the mean or median: the changing proportion of individuals with incomes falling within a band around the average. Obviously these measures are not the same, and may yield different results.

Still another group of writers in this context have been concerned with more than the lot of the middle class per se and have felt that attention should be directed at the entire spectrum of incomes. So, for this purpose, the Gini coefficient has been employed as the traditional measure of income inequality, although it may be inappropriate for identifying the location of changes in the distribution, which in fact is the main advantage of the quantile and distance formulae. At any rate, the Gini sometimes

gives different results from those arrived at using quantile or distance formulas. This paper will report on all these measures as well as a new index of polarization, so as to give as broad a picture as possible of the income distribution, although there are still other measures which will not be looked at.[1]

EMPIRICISM; COMPREHENSIVENESS

Most studies of the declining middle phenomenon have gone no further than to report the course of inequality measures over time in particular population sub-groups defined by the factors in question. But to say that, because, for instance, the share of income going to the middle class does not vary across age groups, the changing age composition is not contributing to a declining middle class (as Thurow (1984) maintains) is not necessarily correct. For one thing, an empirical relationship between age and income distribution must be established to permit a proper evaluation of that statement. For another, there is a need to look at <u>all</u> variables <u>together</u>; focusing singly on one particular factor ignores the possibility of variables impacting on the income distribution in such a way as to cancel one another out.

Indeed, few past efforts in this area have set out to make a quantitative investigation in such a manner. One which did was the study by Lawrence who used "constant-share" analysis to "explain" the difference between actual middle class job growth

and the hypothetical growth that would have occurred had middle class jobs increased at the same pace as overall employment, over the period in question. He explained the difference by decomposing it into portions due to (i) changing sectoral composition of employment, (ii) changing sex mix, and (iii) an unexplained "residual." Another way of identifying the causes of middle class decline collectively is to use regression analysis, as Belous, et al. did. Under this approach, the inter-temporal variations in the Gini coefficient and the portion of income going to the middle class were explained empirically in terms of certain variables. Whether or not their impact had been significant was also determined.

Yet another method of measuring the contribution of various factors to income inequality is to use the "shift-share" method that Bradbury used. This technique calculates how much the middle class share of all families would have declined between two points in time because of changes in a specific variable. This is done by holding constant at starting point levels all other variables being considered, but allowing the particular variable under question to evolve as it did. The other technique used to analyse the contribution of various changes to income equality was the standardization procedure as reported in Wolfson (1986b). Similar to Bradbury's approach, standardization basically tries to ask the question of how much the distribution would have changed, and in what direction, if, for example, the age structure of the

population or the income composition had not changed over the period in question. This, in fact, is the technique used in this paper, as outlined in the next section.

CAUSES

The final element of the present approach, as it evolves from the reading of the literature, is the choice of variables to be used in the investigation. As stated above, this paper will attempt to be as comprehensive as possible and include all measurable factors -- both demographic and structural -- considered to underlie shifts in the distribution of employment income. Based on past research efforts, the variables included in this paper, along with a brief explanation, are as follows.

Structural change

Technological Change/Occupational Shifts

The principal way in which technological change affects distribution of income is through changes in the occupational structure. As outlined above, automation has both de-skilled a lot of jobs and placed a premium on others such as scientists, creating a vacuum in the middle of the skill spectrum. It has, similarly, placed a greater emphasis on white-collar skills. Another way of approaching the technological change issue is via

the industries, by identifying which ones are high-tech input users and then examining their distributional properties.

Changes in the Industrial Structure

The ongoing shift of employment in the postwar period from the manufacturing sector to the service sector has also had implications for the distribution of income. This de-industrialization trend is integral to the income-polarization thesis, which sees middle-income jobs as less typical of service-sector than manufacturing employment.

Increasing Part-Time Employment

Part-time workers, most of them earning less than full-timers, are growing in number. This implies an expansion of the lower class at the expense of the middle income earners.

Demographic change

Rising Female and Youth Participation

Throughout the 1970s, the "baby boomers" and females entering the labour market tended, because of lack of skills and experience, to take part-time, high-turnover, low-paying jobs, thus swelling the numbers of people with lower incomes. As these

workers mature and gain experience, however, their incomes should rise, thus restoring the depleted ranks of the middle class. But, by the same token, it is pointed out that there is no reason to believe that the large cohort of "baby boomers" that is now depressing the average wage level will not continue to do so as they move along their career paths.

Education

One of the fundamental determinants of employment income is educational attainment; therefore, as educational levels change, we would expect the income distribution to be affected.

While the above variables have been most often cited as important influences on the distribution of employment income, there are at least two others that have also been frequently implicated but which will not be explicitly included in the analysis. One is the business cycle and the unemployment rate; the reasons for their exclusion are that the focus of the analysis will be on only those working and that it would be difficult, at any rate, to quantify their impact on the distribution. The other notable variable missing from the investigation is the de-unionization trend, which, as pointed out, observers from the United States have mentioned as being a factor in the disappearance of middle-class jobs. But, because in Canada such a trend is not as apparent, it will not be introduced into the analysis.

NOTE TO CHAPTER 3

1 See, for example, Medoff and Strassman (1985), who use a log-variance measure, and Love and Wolfson (1976) for other measures.

4 DATA AND METHODOLOGY

This section will outline how the impact of various economic and demographic changes on the distribution of employment income is quantified, with a view to empirically evaluating the declining middle debate. The analysis is in two parts. In the first part, the emphasis is on technological change in industries, where much of the conjecture over the causes of the declining middle is concentrated. The data used were from Statistics Canada's Input/Output structure and the 1971 and 1981 Censuses of Canada, which permit detailed industry analysis along these lines.

But another important part of the declining middle debate is the role played by demographic shifts. Therefore, the second part of the analysis is based on the Survey of Consumer Finances, which provides suitable demographic detail in addition to industry and occupational information. The degree of reliability of the latter at the detailed level, however, is not as high as it was on the Census tapes available. In Table 1, these two bodies of data are contrasted; in the balance of this section, the two lines of analysis are outlined.

Table 1

Comparison of Two Data Sets for Income Distribution Analysis

	Data set	
	Census-based	SCF-based
Time frame	1971, 1981 only	1971, 1975, 1979, 1982, 1983, 1984
Occupational/industrial reliability	yes	only for broad groups
Demographic detail	none	yes: age, sex, education
Employment status	full-time/ full-year only	full-time/ full-year and less than full-time/full-year
Income types	employment only	all types, but will concentrate on employment
Unit of analysis	individual	census family converted to individual-based

CENSUS

This portion of the analysis is based heavily on the work of Tom Siedule (1986). The procedure was in two stages: the first preliminary stage to distinguish high-tech industries from the rest of the economy,[1] the second to determine the distribution of employment income in these industries. First, because the concern is with the influence of new technology on employment and employment income, the emphasis was on users of high-tech products rather than the producers of them. That is, what is important in determining "high-techness" is how a product is produced not necessarily what is produced. Therefore, Siedule took the information available in the Input/Output "use" matrix, which contains data on all intermediate commodity inputs at the two-digit 1970 Standard Industrial Classification (1970 SIC) level. On the basis of informed judgements about the "high-techness" of inputs, Siedule calculated the ratio of the total value of high-tech inputs to the total value of all intermediate inputs in all industries, which were then sorted on the basis of these ratios. The final preliminary step was to take the top-third of these industries as comprising the high-tech sector, with the mid- and low-tech sectors similarly established. This entire exercise was carried out on both 1971 and 1980[2] data on the basis of the same list of high-tech inputs.

For the next stage of the analysis the aim was to examine the distributional properties of the industries and of, therefore, the technological sectors. The analysis was based on a micro file obtained from the 1971 and 1981 Census of Canada, containing the two-digit SIC industry[3] and average employment income of individuals aged 15 and over who worked full-time/full-year in the years prior to the respective Census years (that is in 1970 and 1980).

The first task was to establish what is meant by the middle class. In this exercise Siedule used the distance formula discussed in an earlier section and arbitrarily assigned individuals to the middle class if their employment income was within 15 per cent of the national mean employment income; the latter was calculated on the basis of the entire sample. Those with income that was no more than 84 per cent of mean were placed in the lower class, while those whose income was more than 115 per cent of the mean were in the upper class. In this way, the relative size of three income classes for different industries was established (since the individual's industry was present on each record). Based on these calculations as well as the results of the preliminary exercise, where the technological "status" of each industry was determined, it was possible to arrive at the income distributions of each technological sector.

The final step of this analysis was to compare the size of the classes, particularly the middle class, for each technology sector, not just for 1981 but between 1971 and 1981 to detect the direction of change over time. The results of this comparison appear in the next section. According to Kuttner's declining middle hypothesis, the expectations are that the size of the middle class is not only smaller in the high-tech sector than in the other sectors, but that over the years it has gotten more so.

But there are a number of difficulties with this analysis. For one thing, the examination not only depends on just two points in time, but stops in 1981 because the 1986 Census data were not yet, and are still not, available. Obviously, there has been much technological advancement during the 1980s that these data would not capture. Another problem is that the data on which the analysis is based exclude both "officially" part-time workers as well as those who would be classified officially as full time but have worked only part of the year (less than 49 weeks). Because the latter two groups naturally earn less than full-timers and are at the same time a growing element of the population, their exclusion from the analysis may distort the results by removing those at the lower end of the income spectrum. Moreover, the growing use of part-time employment is likely a manifestation of technological change. The final limitation is that, as was mentioned earlier, the tapes lacked information on the changing demographic structure of the population -- an important element of

the declining middle thesis. Therefore, the Survey of Consumer Finances was used, a source of data which, though it lacked reliable industrial detail, was able to overcome most of the drawbacks encountered in using the Census.

SURVEY OF CONSUMER FINANCES

To carry this part of the analysis, arrangements were made with Statistics Canada for the development of a detailed data set and sophisticated computer package (STANDIST), which together would be able to test most of the elements of the declining middle debate.[4] As a preliminary step, changes in employment and employment income within population sub-groups defined by the factors under study are reported to corroborate certain perceptions about demographic and structural shifts in the labour market.

The data set used is based on the Survey of Consumer Finances (SCF), a generally biennial household survey.[5] The file was originally composed of records containing income information on large samples of census families and unattached individuals for the selected years 1971, 1975, 1979, 1982, 1983, and 1984. A census family is, in essence, a nuclear family composed of at least a head, possibly a spouse, and, possibly, unattached children living at home. Each family unit record was identified by the family income, size, and marital/fertility status of the heads (single, married; with or without children), while the head

and spouse (if one exists) or unattached individual were identified by age, sex, education, occupation, industry and employment status (part-time/full-time; employed or unemployed). The income elements covered include employment, investment, transfer, disposable and total income. However, as was said, the primary (though not exclusive) concern is with employment income which, it was presumed, was more sensitive to labour market forces than other income elements.

Because of the aforementioned interest in the individual, this file was converted from a family-based to an individual-based one, by splitting family records containing both head and spousal information into two records. Missing from the analysis, then, are the relatively small number of children still living at home who are working. In addition, since the main focus is on the impact of technology on earned income, unemployed individuals were excluded from the sample. Similarly eliminated are those with only minimal labour force attachment, which were defined as those earning less than 2.5 per cent of the mean industrial wage. These manipulations leave a work force of "effective labour force participants" (ELFPs) that is, strictly speaking, just a sub-sample of the population at large and may not, therefore, reflect national population breakdowns. This does not mean, however, that income distributions obtained from this data set are not representative of reality in the population sub-groups.

The software package used affords much flexibility as to the indicators of middle class decline. One indicator is the mean, the traditional measure of central tendency and, in real terms, a good indicator of how workers are doing generally. Since the mean cannot capture distributional trends and, more particularly, what is happening to the middle class, however, the previously discussed quantile and distance indicators were used. With the former measure, one can observe the share of income going to middle income earners, in two ways -- as the middle one-third (tertile) and as the middle 60 per cent (middle three quintiles) of earners ranked by their employment income. Using the distance formula, it was possible to measure, rather than changing income shares, the changing relative size of the middle class. This was done by counting up those whose income lies within 25 per cent of the national mean on either side and then dividing this number into the total number of individuals in the file -- much like the measure employed in the Census-based analysis.

In addition to indicators of middle-class erosion, there is also concern with the wider issue of income inequality. The traditional measure of income inequality is the Gini coefficient, which gauges the extent to which complete inequality has been reached.[6] It is calculated as follows:

$$\text{Gini} = \sum_{i=1}^{I} (P_{i+1} - P_i)\ (Y_i + Y_{i+1}) \qquad (1)$$

where P_i = the cumulative population share of the i^{th} income class,

Y_i = the cumulative income share of the i^{th} income class, and

i = the i^{th} of the I equally sized income classes (quantiles).

Its maximum value is one; the higher it is, the less the equality of the income distribution.

A separate, though related, issue is that of income polarization, for it is possible to have equitable income distribution that is, nevertheless, skewed to the upper and lower classes (that is, polarized). W-Pol, a prototype, based on the extent to which the population tends to cluster at two discrete (end-) points along the income spectrum was used to measure polarization.[7] It is calculated as follows:

$$\text{W-Pol} = (\text{PLTM} - \text{ILTM}) \div \text{Gini} \qquad (2)$$

where PLTM = the population share with income less than mean income,

ILTM = the income share of those whose income is less than the mean income, and

Gini = the same as in (1) above.

The greater the value W-Pol takes, the greater the polarization. When it takes its upper bound of one, the distribution is not only completely polarized but completely inequitable.

The software package used is also flexible as to how the declining middle hypothesis is tested. In so doing, a two-stage approach is employed that attempts to answer two questions. The first is "Have changes in the sex, age, educational, occupational, and industrial structure of the population and income taken place that may have had a bearing on the income distribution?" In answering this question the analysis will be merely descriptive. But the next question is "What is the direction and magnitude of the impact of those changes on the overall distribution of employment income?" It is in answering this second question that standardization techniques are used.

In the first, descriptive part of the analysis are generated the various measures of middle class decline within the different population subgroups defined by factors alleged in the literature to be contributing to the erosion of the middle class. First, a look at demographic variables. As was said, the growing number of female participants in the labour market may be contributing to a larger lower-income class. Therefore, the inequality measures by sex to see if low-income earners are indeed concentrated among females will be looked at. Similarily, observation of the erosion indicators among different age groups will determine whether or not the declining middle has been, as some declining middle proponents have contended, closely associated with age. Age groups studied are 15-24 years, 25-44 years, 45-64 years, and 65 years and over. Also, because the educational attainment of the

labour force has implications for the distribution of income, the inequality measures for the different levels of educational attainment will be generated.

In addition to the demographic structure of the labour force, its industrial composition is also important because of the employment shift from the supposedly well-paying manufacturing sector to the (supposedly) poorly paying service sector. Therefore, inequality measures will be computed for different industry categories, namely the primary (agriculture, fishing, forestry, mining), secondary (manufacturing, construction), trade, services (finance, transportation, business), and public (including government, education, and health) sectors. The latter three were separetely identified to capture different patterns of growth within the so-called "tertiary" sector, especially as the public sector is falling in significance while "services" grow. Relatedly, the inequality measures will be reported for different occupational categories, since the changing occupational composition, as a manifestation of the skill implications technological change has allegedly affected the distribution of income. The occupational groups studied are professional/ managerial, clerical/sales, and blue collar (including service, primary, processing, fabricating, construction, and material handling occupations). It is of particular interest to distinguish the higher-qualified professionals and managers from the lower-skilled clerical and sales workers. Finally, the

analysis will include a look at the pattern of inequality among part-timers whose numbers are growing in the labour force.

The detection of skewness in particular population sub-groups, however, does not answer the question of whether or not these factors are contributing to a declining middle. To address this issue empirically, the standardization technique available in the software package STANDIST will be used. The advantage of standardization is that it allows the user to disentangle the impacts of particular factors on a distribution.

Basically, the idea of standardization is to compare a current year's income distribution, as revealed in the indicators described above, with a hypothetical one in which the structure of the factor under question has been held fixed at some reference year's level.[8] If, for example, the re-weighting of the 1984 income distribution using the 1975 industrial structure led to a smaller middle class, it may then be concluded that during the 1975-84 period the changing industrial mix has, in fact, made a positive contribution to the size of the middle class. If, on the other hand, the result of holding the occupational composition fixed at the 1975 level could be shown to be a lower Gini coefficient in 1984, it may then be presumed that the shifting occupational mix has, in fact, been disequalizing to the distribution of income since, without such change, inequality would have been less. This procedure, in other words, is able to

measure the distributional impacts of the shifting population structure.

Alternatively, it could be determined what effect shifts in the average incomes of the different population sub-groups have had on the distribution of income. For example, by applying the 1971 mean incomes of males and females to the 1984 distribution, one can check to see whether increases in the mean income of women have expanded or contracted the size of the middle class. One final dimension upon which one can standardize is the "shape" (the degree of inequality) of the distribution. Along this line of analysis, one can determine whether or not the growing income inequality experienced by the young, for example, has had an impact on the overall income share of the middle class.

STANDIST, then, turns out to be a very versatile tool perfectly suited to the analysis contemplated here. For one thing, it affords the user a fairly wide selection of inequality measures. For another, it permits the user to standardize not only by the population shares and mean incomes of the different subgroups, but also by the shape of the distribution. Moreover, either single or multiple standardizations are permitted; that is, the user can standardize by one, two, or all of the factors discussed above, or, even generate unstandardized results. Finally, STANDIST gives the user the capability to standardize any one year by the conditions in any other year or years.

NOTES TO CHAPTER 4

1 All of the following discussion of the Census-based analysis is taken from the pioneering works carried out by Tom Siedule (1988). For a brief description, see Economic Council of Canada (1987).

2 At the time of writing, 1980 was the last year for which detailed input/output data were available. It was assumed the technological structure of 1980 would apply also to 1981, the year for which the Census data were available.

3 Of course much finer industry breakdowns were available but this level of aggregation served the purposes of that analysis.

4 Thanks are due to Statistics Canada's Social and Economic Studies Division, under the directorship of Michael Wolfson, for doing the bulk of the computations.

5 For more details on the SCF, see Income Distribution by Size in Canada, Statistics Canada, Cat. 13-207, any year.

6 See Love and Wolfson (1976) for more details.

7 See Wolfson (1986a) for more details on W-Pol.

8 Wolfson (1986b) describes this procedure in much greater detail than presented here.

5 RESULTS

CENSUS-BASED ANALYSIS RESULTS

First, the results of the Census-based analysis will be reported (Table 2). With regard to the employment shares (part (A)), two observations stand out. The figures show first that, during the 1970s, the middle class share of total full-time/full-year employment (hereafter referred to as "employment") fell, but by only a relatively small amount (1.5 percentage points) to 22.7 per cent in 1980. At the same time, the lower-income class, too, fell in relative size while the upper-income class rose to the extent that it absorbed departures from the other two classes. As a corollary it may be observed that a declining middle is not necessarily a bad thing if it is part of an overall improvement in living standards.

Another conclusion drawn from Table 2(A) is that the middle class shrinkage cannot necessarily be attributed to technology. This is demonstrated by the fact that, during the 1970s, the number of middle-class workers in the high-tech sector rose as a proportion of total employment (from 10.9 per cent to 11.9 per cent) at the same time as the equivalent number in the other two technological sectors combined was falling (from 12.1 per cent to 10.4 per cent). So, in fact, it was the mid- and low-tech sectors

Table 2

Share of Total Full-Time/Full-Year Employment and Employment Income by Income Class and Technology Sector, Canada, 1971 and 1981[1]

	High-tech sector[2]			Rest of economy[2]			Total economy		
	1971	1981	Change	1971	1981	Change	1971	1981	Change
	(Per cent)		(Percentage points)	(Per cent)		(Percentage points)	(Per cent)		(Percentage points)
A Share of Total Employment[3]									
Income class[4]									
Upper income	12.9	15.1	2.2	14.7	15.0	0.3	28.8	30.5	1.7
Middle income	10.9	11.9	1.0	12.1	10.4	-1.7	24.2	22.7	-1.5
Lower income	20.4	24.4	4.0	22.6	20.9	-1.7	47.0	46.8	-0.2
All classes	44.2	51.4	7.2	49.4	46.3	-3.1	100.0	100.0	0.0
B Share of Total Employment Income[3]									
Income class[4]									
Upper income	23.4	25.8	2.4	24.8	24.7	-0.1	50.3	51.1	0.8
Middle income	10.8	11.9	1.1	12.1	10.4	-1.7	24.0	22.7	-1.3
Lower income	11.9	14.4	2.5	11.8	11.1	-0.7	25.7	26.2	0.5
All classes	46.1	52.1	6.0	48.7	46.2	-2.5	100.0	100.0	0.0

1 Based on individual's industry in 1971 and 1981 and employment income in 1970 and 1980.
2 Based on a methodology that ranked industries according to the share of high-tech intermediate inputs in all intermediate inputs and then assigned the industries to three equal technology sectors. The top sector is high-tech; the other two comprise the "rest of the economy."
3 Figures show contribution of the high-tech sector and the rest of the economy and three income classes to total employment or total employment income. Figures will not add across to the total for the economy for either year because religious organizations, other government offices and unspecified/undefined industries are excluded from the technological classification.
4 Individuals were assigned to three classes according to the distance their 1970 and 1980 employment income was from the national mean: lower class is less than 85 per cent of the mean, 85 - 115 per cent is middle class, greater than 115 per cent is upper class.

Source Calculations based on Census of Canada, 1971 and 1981, unpublished data.

which were eroding the middle class. In other words, industries with relatively low utilization of high-tech inputs appear to have lost ground in generating middle-class jobs. At the same time, however, the high-tech sector contributed to an increase in the relative size of all income classes -- including the lower-income class: there may be a down-side to technological change as well.

To round out the section employment income shares will be looked at (Table 2(B)). Note, first of all, the constancy of the income structure between 1970 and 1980. The only major change was a gain in income share by low-income earners in the high-tech sector. It is also observed that the stability merely preserves an inequitable distribution as there is almost a complete reversal of the upper and lower classes' positions vis à vis the employment shares of Table 2(A): the relatively large low-income class has the smallest share of employment income. Finally, note that the high-tech sector's share of total employment and total employment income increased to the point where it commanded over one-half of both by 1980.

SCF-BASED ANALYSIS RESULTS

As background to this analysis, changes in employment[1] and employment income in the various categories of variables under consideration will be looked at (Table 3). The data will serve to corroborate certain perceptions held about shifts in the labour

Table 3

Employment and Employment-Income Trends in Selected Population Sub-Groups of Individuals,[1] Canada, 1971-84

	Employment			Employment income			
	Growth 1971-84	Share 1984	Change in share 1971-84	Share 1984	Change in share 1971-84	Relative mean 1984	Change in relative mean 1971-84
	(Per cent)		(Percentage points)	(Per cent)	(Percentage points)	(Per cent)	(Percentage points)
Overall	35.7	100.0	...	100.0	-	100.0	...
By sex							
Males	19.5	57.9	-7.9	70.6	-10.1	122.5	1.5
Females	67.0	42.1	7.9	29.4	10.1	69.4	11.1
By age							
15-24	19.8	21.6	-3.9	6.5	-2.6	57.9	-4.6
25-44	60.5	51.3	7.9	60.5	7.1	104.5	-4.6
45-64	15.7	25.4	-4.4	31.3	-3.8	109.6	1.9
65+	-1.1	1.7	-0.6	1.7	-0.8	74.0	..
	1975-84		1975-84				
Overall	18.5	100.0	...				
By education[2]							
Elementary or less	-26.5	12.4	-7.6	11.5	-9.4	82.3	1.9
Some/all secondary	27.5	50.2	5.6	42.7	-4.0	88.7	-5.4
Some postsecondary	22.3	9.9	0.3	8.5	0.7	93.4	-6.7
College certificate	17.1	14.0	-0.1	14.5	4.5	103.4	-5.6
University degree	66.1	13.5	3.9	22.8	8.2	153.5	-29.6
					1975-84		1975-84
By employment status[3]							
Full-time/full-year	36.4	65.1	-0.6	82.3	0.2	126.5	1.4
Less than full-time/ full year	38.0	33.8	0.9	17.4	-0.1	51.5	-1.7
By occupational group							
Managerial/professional[4]	48.2	27.0	5.4	38.9	6.5	134.2	2.2
Clerical/sales	17.0	40.3	-5.0	20.0	-2.2	80.1	-3.5
"Blue collar"[5]	3.0	32.7	-4.9	40.9	4.1	90.2	-4.2
By Industrial Group							
Primary[6]	9.2	7.0	-0.6	6.3	-	94.7	-5.5
Secondary[7]	2.7	23.1	-3.5	26.3	-3.7	109.2	1.5
Trade	17.8	17.5	-0.1	13.3	0.5	83.5	-4.7
Services[8]	40.4	31.4	4.9	27.5	3.0	93.7	-2.0
Public[9]	14.8	21.0	-0.7	26.4	0.5	113.5	7.4

... Figure not applicable.
.. Figure not available.

1 For employment, an individual is all those who are employed. For employment income, an individual here is one who is an effective labour force participant, defined as earning at least 2.5 per cent of mean industrial wage.
2 Denotes the highest level of educational attainment. Information is based on Labour Force Survey data only since 1975 for reliability reasons.
3 Less than full-time/full-year does not correspond to the traditional LFS definition of part-time, which is based on hours per week. According to the SCF definition, a person could be working on a full-time basis but only for part of the year and thus be part of the "less than full-time/full-year" category. Because of reporting problems, figures in the "Share" column do not add to 100.
4 Includes managers, administrative workers, those in health, those in law, teachers, all forms of artists, scientists, engineers, and related.
5 Includes service (waiters, police officers, for example), primary (farming, mining, fishing, logging), processing, machining, fabricating, assembling, repairing, and material handling occupations.
6 Includes farming, mining, fishing, forestry industries.
7 Includes manufacturing and construction.
8 Includes finance, transportation, communications, business services, restaurants and hotels, personal services, etc.
9 Includes public administration, schools and hospitals.

Source Employment: Statistics Canada, Labour Force Survey, except employment status, which was Survey of Consumer Finances ("population share" and "sample size" data); Employment income: Statistics Canada, Survey of Consumer Finances; calculations by the Social and Economic Studies Division of Statistics Canada, and Economic Council of Canada.

market. For education, employment breakdowns are presented starting only in 1975 for data availability reasons; this was not a problem for incomes. With regard to employment status, occupation and industry, the SCF experienced reporting problems in 1971, which explains why the income analysis begins in 1975 unlike the other dimensions.

First, confirming common knowledge, between 1971 and 1984, the gap between the employment and the income shares of males and females, though still large, narrowed. This resulted from the faster employment growth experienced by women over the period. Another explanation is that the mean income of women increased relative to the national average, while that of men showed little change, remaining at roughly 120 per cent.

Turning to the age dimension, it can be seen that between 1971 and 1984 the young (15-24) and those aged 45 to 64 diminished in significance, while the employment of prime-age (25-to-44-year-old) "baby boomer" workers grew at a very rapid rate, translating into a 7.9 percentage point increase in employment share. This might be expected to change in light of the baby "bust" of the 1970s. Older workers (65+), on the other hand, experienced a decline in numbers, though their employment share remained stable. The income shares of each age group displayed a similar pattern. On the other hand, the mean employment income of the prime-aged

fell against the national average while those aged 45 to 64 years gained slightly.

Looking at the educational patterns, observe the growing importance in the labour market that is being placed on education: the employment and income shares of those with no more than elementary education fell (by 7.6 and 9.4 percentage points), while the shares of those with a university degree increased (by 3.9 and 8.2 percentage points). Indeed, there was an absolute fall in the employment of the former group. Interestingly, the employment of college graduates also fell in relative terms, whereas those with no more than secondary school education, having experienced rapid employment growth (27.5 per cent), actually increased their share of the work force to just over one-half. Looking at mean incomes, however, it can be seen that, relative to the national average, each educational group, save those with no more than elementary school, experienced a decrease. It would seem, then, that the (absolute) employment losses in the latter group helped, ironically, to raise the average income of those who remained. At the same time, those with a university education were experiencing the greatest losses in mean income -- a reflection of the increasing number of such graduates (66.1 per cent increase), which, too, explains their growing income share.

With regard to employment status,[2] the proportion of persons

working full-time/full-year fell somewhat, though their income share rose. Relative to the national-average employment income, a person working less than full-time/full-year lost some ground, while full-timers gained.

On the occupational dimension, it was found that professionals/managers, with the fastest employment growth, increased both their employment and their income shares. Clerical/sales workers, on the other hand, maintained a stable share of the work force over the period but saw their share of employment income decrease. And blue-collar workers, including farmers and service workers, experienced decreases in both employment and income share -- a reflection of shifts in the industrial structure. Also, the gap in mean incomes among occupations relative to the national average widened, as the average income of the already higher-paid managers/professionals increased relatively while the average income of the lower paid sales/clerical and blue-collar workers fell.

Finally, there were some shifts in the industrial distribution of the work force: services showed significant gains while the secondary sector lost ground. In fact, in employment-share terms services absorbed the employment losses of all other industries combined (4.9 per cent). There is reason to believe, however, that this trend cannot continue indefinitely as the pace at which the service sector is increasing its share has slowed

considerably.[3] (The surprisingly small employment losses recorded here for the public sector may be due to the fact that it is defined to include the burgeoning health sector.) Similar to the employment shares, the income share of services increased the most while that of the secondary sector suffered the greatest decrease. In terms of mean income, the primary and trade sector lost the most ground relative to the national average; the public sector gained the most.

These observations point to the fact that, between 1971 and 1984 and between 1975 and 1984, shifts did indeed take place in the distribution of employment and income by sex, age group, educational level, employment status, occupation, and industry. The question that remains is: are these changes in the labour market reflected in the distribution of employment income?

To address this issue, the overall distribution, as measured by several inequality measures, is observed (Table 4). The most remarkable thing to note is how constant the distribution has been between 1971 and 1984 as indicated by the quantile measures (tertiles and quintiles), despite the above-noted changes. That is, while there was some expansion of the middle class income share during the 1970s, since then there has been some minor shrinkage, to the point that its income share in 1984 is about where it was in 1971. The difference is that in 1984 there is less income in the lower class (lowest tertile) and more in the

Table 4

Employment Income Inequality Indicators of Individuals,[1] Canada, 1971-84

	1971	1975	1979	1982	1983	1984
			(Per cent)			
Income shares of tertiles:[2]						
Top	60.0	59.8	59.3	60.9	61.3	61.2
Middle	29.7	29.6	30.3	29.7	29.3	29.5
Lowest	10.3	10.6	10.4	9.5	9.4	9.3
Middle three quintiles'[2] income share	53.0	53.8	54.9	54.0	53.5	53.7
Middle class'[3] population share	30.0	29.7	28.1	27.1	26.0	25.7
Gini coefficient[4] (index)	0.393	0.389	0.381	0.401	0.405	0.404
W-Pol[5] (index)	0.699	0.701	0.710	0.711	0.713	0.716
Mean						
(current $)	6,597	9,884	13,829	18,089	19,383	19,865
(constant 1981 $)	15,632	18,120	17,136	16,325	16,538	16,243

1 An individual here is one who is an effective labour force participant, defined as earning at least 2.5 per cent of mean industrial wage.
2 Individuals were ranked on their annual employment income and divided into three (tertile) or five (quintile) groups. Each group's share of total employment income was then calculated.
3 Middle class here is comprised of those individuals whose income is within 25 per cent of mean, either way.
4 A traditional measure of income inequality, rising with the degree of inequality.
5 A measure of income polarization, rising with the degree of polarization.

Source Calculations based on unpublished data from the Survey of Consumer Finances, Statistics Canada, Social and Economic Studies Division, and the Economic Council of Canada.

high income class (highest tertile) than there was in 1971, thus confirming a find ding of the Census-based analysis. On the other hand, using the d distance formula, where the middle class is defined as those with incomes within 25 per cent on either side of the overall mean, there appears to have been a constant though gradual erosion i in the size of the middle class, from 30 per cent to 25.7 per cent. Therefore, while the income share of the middle decreased very little, its relative size (share of employment) fell by a greater amount, implying that the average employment income of those remaining in the middle class likely rose.

Turning to measures of overall equality, note that the Gini coefficient displays a pattern similar to the quantile indicators, in that during the 1970s it was steadily decreasing in value, implying growing equality, but that in the 1980s that pattern has reversed itself. On the other hand, W-Pol's value has been rising slowly since 1971, indicating a gradual increase in income polarization. It should be borne in mind, however, that the small sample size on wh ich the calculation of the above two measures is based implies tha t the results may not be significant to the third decimal digit. F inally, it is interesting to note that, though mean employment i ncome increased between 1971 and 1984, it has actually fallen w hen measured against the consumer price index -- implying that Can adian workers have lost ground to inflation.

Overall, then, the distribution of employment income remained fairly stable over the years. One clue as to why there was little change, despite some notable demographic and structural shifts in employment and income, is to look at the distribution of income within the population sub-groups defined by the factors under question (Tables 5 and 6).

A comparison of the indicators for males and females for the 1971-84 period (Table 5) generally reflect patterns for the total economy (Table 4). The income share of middle-class males and females remained fairly stable, at roughly 30 per cent for both. On the other hand, the numbers of both males and females in the middle class declined as a proportion of the total work force at about the same rate: for males, the share fell from 39 per cent in 1971 to under 33.5 per cent in 1984; for females, from 27 per cent to 23.5 per cent, respectively. Finally, there was a slight tendency for employment income to become more unequal for both sexes, though less so among females, who, on the other hand, were characterized by growing income polarization.

Looking at the indicators by age, note the slightly increasing inequality in all age groups (except for those 65 years and over, who experienced a marked increase). Every age group appears to have suffered some decline in the middle, whether measured by income share or work-force share. It was the postwar "baby boomers," now aged 25 to 44, however, who, in 1984, exhibited the

Table 5

Employment Income Inequality Trends for Individuals[1] in Various Age and Sex Groups and by Educational Attainment, Canada, 1971-84

		Tertiles[2] Income shares			Income share of middle quintiles[3]	Relative size of middle class[3]	Gini coefficient[4]	K-P rho[5]
		Lowest	Middle	Highest				
		(Per cent)						
Sex groups								
Males	1971	10.6	30.6	58.8	52.1	30.0	0.393	0.714
	1984	8.9	29.9	61.2	54.1	27.2	0.419	0.729
Females	1971	9.8	30.1	60.0	53.9	28.7	0.409	0.699
	1984	9.2	29.2	61.6	55.6	25.7	0.436	0.724
Age groups								
Under 25	1971	10.4	31.8	57.8	50.6	28.8	0.385	0.716
	1984	9.0	28.3	62.7	52.6	22.7	0.419	0.732
25-44	1971	11.5	31.0	57.5	55.6	33.0	0.364	0.692
	1984	10.4	30.5	59.1	55.3	27.8	0.378	0.714
45-64	1971	10.8	29.2	60.1	52.8	30.7	0.394	0.694
	1984	9.7	29.5	60.9	53.7	26.7	0.401	0.710
65 +	1971	5.0	24.9	70.1	47.0	20.4	0.522	0.711
	1984	3.2	19.9	76.9	38.2	17.4	0.607	0.717
Educational attainment								
None or elementary								
	1971	10.7	31.0	58.4	56.1	28.3	0.371	0.714
	1984	8.8	29.8	61.7	54.5	24.0	0.414	0.719
Some/all secondary								
	1971	10.9	30.8	58.3	55.9	29.3	0.370	0.708
	1984	9.6	29.9	60.6	54.5	25.7	0.395	0.720
Some postsecondary								
	1971	9.3	30.8	60.3	54.7	30.1	0.388	0.704
	1984	9.0	30.1	60.9	55.2	28.7	0.390	0.728
College certificate								
	1971	10.3	31.1	58.7	53.8	30.3	0.370	0.704
	1984	11.1	31.2	57.7	54.3	27.8	0.380	0.718
University degree								
	1971	11.0	27.8	61.3	50.7	33.1	0.401	0.707
	1984	10.9	31.2	57.8	53.7	28.3	0.389	0.694

1 An individual here is one who is an effective labour force participant, defined as earning at least 2.5 per cent of mean industrial wage.
2 Individuals were ranked on their annual employment income and divided into three (tertile) or five (quintile) groups. We then calculated each group's share of total employment income.
3 Middle class here is comprised of those individuals whose income is within 25 per cent of mean, either way.
4 A traditional measure of income inequality, rising with the degree of inequality.
5 A measure of income polarization, rising with the degree of polarization.

Source Calculations based on unpublished data from the Survey of Consumer Finances, Statistics Canada, Social and Economic Studies Division, and the Economic Council of Canada.

least inequality according to all indicators. This would appear to run counter to the premise that the sheer numbers of that generation alone would cause a skewing of its income distribution to the lower extremes. Still, as Table 4 shows, the mean income of this group fell in comparison to the national average. Finally, all measures indicate that it is the shrinking segment of the population aged 65 and over and still working that has exhibited the greatest inequality.

The education breakdown of the inequality indicators reveals no drastic changes in the income or work-force shares of the middle class, apart from those with a university degree. Within the latter group, in fact, all inequality indicators except W-Pol, which has risen only slightly, point to growing equality in the distribution of employment income. It would seem, then, that the rising number of persons acquiring a university degree may be contributing to a more equitable distribution of income.

Turning to non-demographic factors (Table 6), note, first that, between 1975 and 1984, the income share of middle-class full-time/full-year workers has increased somewhat (e.g., tertiles, 29.8 to 30.8 per cent), while that of "part-time" workers has marginally fallen (25.8 to 25.1 per cent). On the other hand, the other indicators -- relative middle-class size and the Gini -- point more favourably to the latter group. In cross-sectional terms, the distribution of employment income among

Table 6

Employment Income Inequality Trends for Individuals[1] in Various Employment Statuses, Occupation and Industry Groups, Canada, 1975-84

		Tertiles'[2] income shares			Income share of middle quintiles[2]	Relative size of middle class[3]	Gini coefficient[4]	W-Pol[5]
		Lowest	Middle	Highest				
		(Per cent)						
Employment status[6]								
Full-time/full-year								
	1975	16.4	29.8	53.8	54.2	39.9	0.300	0.693
	1984	15.0	30.8	54.2	55.9	37.6	0.310	0.699
Part-time	1975	8.6	25.8	65.6	48.6	22.1	0.448	0.726
	1984	8.2	25.1	66.7	47.4	22.1	0.462	0.726
Occupational group								
Managerial/professional[7]								
	1975	12.0	29.8	58.2	54.0	34.4	0.368	0.690
	1984	11.9	30.5	57.6	55.1	32.4	0.360	0.699
Clerical/sales								
	1975	11.1	29.2	59.7	52.9	33.9	0.388	0.689
	1984	10.2	30.2	59.5	54.6	28.7	0.384	0.710
Blue collar[8]								
	1975	10.9	31.1	58.0	56.2	29.5	0.367	0.710
	1984	8.8	29.6	61.6	54.5	22.2	0.407	0.731
Industry group								
Primary[9]	1975	6.9	27.2	66.0	50.2	23.9	0.470	0.706
	1984	5.6	25.1	69.3	48.2	18.0	0.502	0.725
Secondary[10]	1975	13.5	31.2	55.2	56.-	35.8	0.328	0.699
	1984	11.7	30.9	57.4	55.9	29.6	0.356	0.711
Trade	1975	9.9	28.6	61.5	52.2	28.2	0.408	0.703
	1984	9.7	29.1	61.3	53.4	24.5	0.402	0.720
Services[11]	1975	9.3	28.1	62.6	51.4	26.4	0.421	0.707
	1984	8.1	28.0	63.9	51.9	22.5	0.435	0.723
Public[12]	1974	11.8	29.8	58.2	54.2	32.7	0.369	0.697
	1984	11.4	30.5	58.1	55.5	30.9	0.363	0.708

1 An individual here is one who is an effective labour force participant, defined as earning at least 2.5 per cent of mean industrial wage.
2 Individuals were ranked on their annual employment income and divided into three (tertile) or five (quintile) groups. We then calculated each group's share of total employment income.
3 Middle class here is comprised of those individuals whose income is within 25 per cent of mean, either way.
4 A traditional measure of income inequality, rising with the degree of inequality.
5 A measure of income polarization, rising with the degree of polarization.
6 Less than full-time/full-year does not correspond to the traditional LFS definition of part-time, which is based on hours per week. A person could be working on a full-time basis but only part of the year and thus be part of the "less than full-time/full-year" category.
7 Includes managers, administrative workers, those in health, those in law, teachers, all forms of artists, scientists, engineers, and related.
8 Includes service (waiters, police officers, for example), primary (farming, mining, fishing, logging), processing, machining, fabricating, assembling, repairing, and material handling occupations.
9 Includes farming, mining, fishing, forestry industries.
10 Includes manufacturing and construction.
11 Includes public administration, schools and hospitals.
12 Includes finance, transportation, communications, business services, restaurants and hotels, personal services, etc.

Source Calculations based on unpublished data from the Survey of Consumer Finances, Social and Economic Studies Division, Statistics Canada.

those working less than full-time/full-year, a growing element in the labour market, is noticeably less equal than among full-time/full-year workers. So, there is some cause for concern for the future, considering the growing trend toward part-time work.

Stability in the middle-class income share is also evident on the occupational dimension. While the work-force share of clerical/sales and blue-collar workers in the middle class decreased between 1975 and 1984, the professional/managerial middle-class share remained fairly constant. Indeed, inequality, as measured by the Gini coefficient, decreased slightly for the latter group, whose numbers are increasing partly as a result of the new technologies. Thus, from this point of view, the further penetration of technology into industry, as it places greater demands on scientists and engineers, will in effect be a positive force on the distribution of employment income.

On the industry dimension, the evidence is not clear-cut over time. While the work-force share with middle-class incomes fell in each sector, the income shares of the middle-income groups showed no great change. The Gini coefficient suggests that inequality increased somewhat in all industries but the trade sector. The polarization indicator, on the other hand, suggests that polarization increased to some extent in all industries. Still, in cross-sectoral terms, the differences in equality appear to justify some of the fears of de-industrialization. What is

revealed is that the shrinking secondary sector exhibits a relatively equitable income distribution as measured by the Gini coefficient, when compared to the services sector, where many of these displaced workers are going. Thus, while there has been little change in income equality within industrial sectors over time, some of the shifts among them appear to be contributing to a less equal distribution of employment income.

On the whole, the analysis yielded somewhat mixed results. Some trends in the sex, industry, occupation, and employment status dimensions appear to be disequalizing to the distribution, while it was seen that changes in the age composition and educational attainment of the work force appear to have exerted a positive influence on equality. It seems that the competing forces, which would otherwise have had an impact on the distribution of income, have, in some way, offset one another. But, these are only tentative conclusions, drawn on the basis of descriptive results. The next step must be to sort out the impacts of the various factors in an empirical fashion in order to determine clearly their contribution to employment income equality.

To do this, standardization techniques described in the previous section are used. In Table 7, the 1984 employment income distribution was standardized by the population structure, mean incomes and shapes of the 1971 or 1975 distribution, univariately, along the dimensions of sex, age, education, employment status,

Table 7

Selected Employment Income Inequality Indicators of Individuals[1] Standardised[2] by the 1971 or 1975 Population Composition, Mean Income and Shape[3] of Selected Factors, Canada, 1984

	Source year	Mean income	Income share of middle tertile	Income share of middle quintiles	Relative size of middle class	Gini coefficient	W-Pol
		($)		(Per cent)			
All groups, unstandardised	1984	19,865	29.5	53.7	25.7	0.404	0.716
Standardised by							
Sex							
Composition	1971	20,845	29.8	54.1	26.4	0.402	0.708
Mean income	1971	18,719	28.6	52.6	23.5	0.419	0.721
Shape	1971	19,869	29.1	53.3	24.8	0.414	0.712
Age							
Composition	1971	19,516	29.0	53.0	24.9	0.417	0.710
Mean income	1971	20,318	29.5	53.6	26.0	0.403	0.717
Shape	1971	19,866	29.1	53.2	24.8	0.416	0.711
Education							
Composition	1971	18,662	29.4	53.6	25.3	0.410	0.710
Mean income	1971	21,600	28.8	52.8	25.4	0.414	0.715
Shape	1971	19,864	28.9	52.9	25.0	0.418	0.708
Employment status							
Composition	1975	20,232	29.7	54.0	26.1	0.406	0.708
Mean income	1975	19,511	29.6	53.9	26.3	0.398	0.715
Shape	1975	19,868	29.7	54.1	26.7	0.400	0.707
Industry							
Composition	1975	19,386	29.3	53.6	25.2	0.412	0.711
Mean income	1975	20,290	29.6	54.1	25.8	0.400	0.716
Shape	1975	19,865	29.5	53.7	25.0	0.408	0.710
Occupation							
Composition	1975	19,994	29.5	53.6	25.7	0.407	0.709
Mean income	1975	19,794	29.5	53.8	25.7	0.402	0.716
Shape	1975	19,867	29.5	53.7	25.8	0.405	0.709

1 An individual here is one who is an effective labour force participant, defined as earning at least 2.5 per cent of mean industrial wage.
2 Based on a process which holds characteristics of the selected factors constant at their source year levels.
3 That is, the degree to which the distribution within the population sub-groups defined by the factors is peaked or flat.

Source Calculations based on unpublished data from the Survey of Consumer Finances, Social and Economic Studies Division, Statistics Canada.

occupation, and industry. In other words, the impact that changes in the demographic and "economic" structure (noted in Tables 3, 5, and 6) have had on the overall distribution of employment income are determined. The results for each factor will be reported, in turn.

Before proceeding note in Table 7 that standardizing by the 1971 or 1975 shape of each variable has, for the most part, left the overall mean income unaffected. This is what you would expect, however, since in this case the 1984 means of the individual population sub-groups are left unchanged; it is just the 1984 shapes (flat or peaked) that are being altered. On the other hand, the reason why the overall mean income changes when standardizing only by the population composition is that, even though mean incomes are not being altered, the weight is (that is, the relative number with each mean income is held fixed at the 1971 or 1975 level). The other thing to be noted about Table 7 is that W-Pol, the measure of income polarization, shows fairly little variation under conditions of standardization and will thus not be mentioned in the upcoming discussion.

To begin, standardizing by sex leads to the conclusion that the growing representation of women in the work force has had little impact on income equality in general (Gini). The changing sex composition, however, did marginally reduce the overall mean income, the income share of the middle class, and middle class

size; for example, the middle class would have been 0.7 percentage points larger in 1984 than it actually was if the sex structure of the labour force had not changed as it did. On the other hand, changes in the mean incomes of, and income shapes within, the sexes appear to have exerted a positive, though still small, influence, expanding the middle class's income share and marginally reducing overall income inequality as measured by the Gini coefficient.

Turning to the age dimension, it was found that, had the age composition of the work force not changed (that is, had there not been a baby boom), the overall mean and middle class size and share would have been less and income inequality worse. The shifting age structure has thus made a positive contribution to income equality. Changes in the mean income of different age groups, however, appear to have had little effect on the distribution, though they did cause the overall mean and middle-class size to fall somewhat. As for the within-age-group distribution (the "shape"), changes there seem to have led to a larger middle class and income share. Contrary to what some have contended, therefore, the entrance and maturation of the baby-boomers in the labour market has not eroded the middle class.

Looking at the standardization by 1971 educational attainment of the work force, it appears that changes in the level of the

educational attainment between 1971 and 1984 had little or no impact on the income share of the middle class but did contribute to an increase in its relative size as well as overall equality. On the other hand, changes in the mean income and income disparity of various population sub-groups defined by the level of education reached have had a moderate desirable effect on all indicators, likely a reflection of the reduction in inequality among university graduates observed in the Gini coefficient column of Table 6.

The next three factors by which the distribution was standardized are what could be termed non-demographic ones. The first of these is the employment status, where it appears the changing composition and relative mean incomes have had little impact on the distribution, except to reduce the size of the middle class somewhat. On the other hand, looking at the "shape" standardization results, we see that a growing inequality of those working less than full-time has had a negative influence on income equality. That is, if in 1984 the part-time/full-time income distributions had remained as they were in 1975, the middle class would have been one percentage point larger (i.e., 26.7 per cent) than it actually was (i.e., 25.7 per cent). As expected, then, the growing part-time trend has meant some loss of middle class jobs.

Changes in the industrial structure appear not to have adversely affected income equality. Indeed, the diminishing significance of the secondary sector and the growing prominence of services noted in Table 4 seem not only to have slightly increased the size of the middle class but, also, increased the overall average income, a conclusion that appears to contradict Kuttner's thesis. Similarly, changes in the mean incomes of sectors have left the overall level of income equality undisturbed, though they contributed marginally to a fall in the national mean. The only other impact of note that can be detected is that of changes in the shapes of the industries' income distributions, which seem to have expanded the middle somewhat. Thus, although all sectors but the public sector have experienced some middle-class decline between 1975 and 1984 (Table 6), the net impact of these changes on the distribution was, if anything, a positive one: the population share of the middle class would have been 0.7 percentage points less than it actually was (25.7 per cent).

Similar to the industrial dimension, the occupational shifts and changes in mean income observed in Table 3 within occupations have hardly affected the distribution at all. As noted in Table 6, all occupations appear to have become more unequal, but Table 4 showed it was the higher-skilled professional/managerial category which was growing in employment size. Therefore, to the extent that this growth may be a manifestation of technological change, we may

surmise that the impact of tech change on the distribution of income is all but neutral.

The above has dealt only singly with the factors under study, treating them as if they affected the distribution in isolation. But there are, of course, interactions among the variables. So, some multivariate standardizations were run to capture situations where factors have obviously not operated mutually exclusively in affecting the income distribution. The results of the exercise the exercise appear in Table 8 and confirm the findings from Table 7.

First, in order to capture the impact of the growing number of young people staying in school longer as well as older workers returning to school, the income distribution was standardized by age and education (S1). This exercise confirms the results from single variate standardizations of age and education (Table 7) with the population composition results appearing to be additive (e.g., for relative size, a multivariate gain of 1.3 points versus individual gains of 0.8 and 0.4 points) and "shape" results not (e.g., for middle quintiles' income share, a gain of 0.5 points versus single variate gains of 0.5 and 0.8 points).

In the next three runs, age and sex were combined with three non-demographic factors. In S2, age and sex were linked to employment status to capture obvious connections between those

Table 8

Selected Employment Income Inequality Indicators of Individuals[1] Standardized[2] Multivariately by the 1975 Population Composition, Mean Income and Shape[3] of Selected Factors, Canada, 1984

	Mean income	Income share of middle tertile	Income share of middle quintiles	Relative size of middle class	Gini coefficient	W-Pol
	($)		(Per cent)			
All groups, unstandardized	19,865	29.5	53.7	25.7	0.404	0.716
Standardized by						
S1 Age and education						
Composition	18,860	29.1	53.2	24.4	0.415	0.712
Mean income	20,991	29.5	53.7	25.7	0.406	0.716
Shape	19,865	29.4	53.2	24.7	0.416	0.712
S2 Age, sex, and employment status						
Composition	20,133	29.3	53.5	25.3	0.413	0.709
Mean income	19,516	29.2	53.5	25.0	0.409	0.717
Shape	19,865	29.2	53.4	25.0	0.415	0.710
S3 Age, sex, and industry						
Composition	20,100	29.4	53.6	25.5	0.410	0.709
Mean income	19,497	28.6	52.8	23.9	0.417	0.721
Shape	19,867	28.8	52.8	24.1	0.420	0.714
S4 Age, sex, and occupation						
Composition	19,611	29.4	53.6	25.3	0.411	0.710
Mean income	19,934	28.6	52.8	24.2	0.417	0.720
Shape	19,866	28.7	52.7	23.9	0.421	0.714
S5 Industry and employment status						
Composition	20,110	29.5	53.8	26.0	0.405	0.708
Mean income	19,700	29.5	53.9	26.0	0.401	0.715
Shape	19,866	29.6	53.9	26.4	0.402	0.707
S6 Age, sex, employment status, industry, and occupation						
Composition	19,845	29.6	53.8	25.7	0.407	0.710
Mean income	19,804	29.1	53.2	25.4	0.412	0.715
Shape	19,875	29.3	53.5	25.5	0.411	0.709

1 An individual here is one who is an effective labour force participant, defined as earning at least 2.5 per cent of mean industrial wage.

2 Based on a process which holds characteristics of the selected factors constant at their source year levels.

3 That is, the degree to which the distribution within the population sub-groups defined by the factors is peaked or flat.

Source Calculations based on unpublished data from the Survey of Consumer Finances, Social and Economic Studies Division, Statistics Canada.

variables, particularly the large and growing number of women and youths in part-time employment.[4] Here the results show that the negative influence of employment status (Table 7) has been countered by the impact of changes in age and, to some extent, sex. To illustrate using population composition and middle-class size results, the combined impact of these three variables was to increase the size of the middle class by 0.4 percentage points, despite the fact that individually sex and employment status had had a negative impact and age a positive one. An attempt was next made to capture the participation of youth and females in the changing industrial mix by entering the combination of age, sex, and industry (S3). The results there confirm the single-variate standardization outcomes. Moreover, any negative outcomes found for individual runs (namely, population composition by sex and mean incomes of age and industry groups) have interactively been transformed into a net positive influence. As for the standardization by age, sex, and occupation (S4), the minimal impact of occupation and the generally positive influence of age and sex have, together, been turned -- additively -- into a fairly strong positive effect. For example, univariately, between 1975 and 1984 changes in the income distribution within sex and age group each enlarged the middle class by 0.9 percentage points, and shifts in occupational income shapes had little or no impact; in the multivariate run involving all three of these variables, the results demonstrate that the middle class would have been 1.8 percentage points larger if none of these shifts had occurred.

Another combination tested was that of industry and employment status (S5), since the growth in part-time employment has been strongly associated with the growth in services.[5] Here, the dominating influence appears to have been the growing part-time element, although the addition of industry appears to have moderated the negative impact of employment status somewhat.

Finally in S6, standardizations were carried out by all variables except education, in the interest of maintaining a reliable cell count; for the same reason, the industry variable with only two sectors, to capture the simple goods to service shift, was introduced. The results there confirm what was found in Table 4 -- that the distribution of income has remained remarkably stable despite all the changes described. That is, the result of holding all the factors constant at their 1975 levels was to leave the 1984 distribution more or less as it actually was; demographic and structural changes appear to offset one another in their impact on income equality between 1975 and 1984.

NOTES TO CHAPTER 5

1 Labour Force Survey data were used to observe changes in employment since it is the primary purpose of the LFS to represent actual employment breakdowns. This does not, however, detract from the accuracy of SCF data in reflecting true income breakdowns.

2 The SCF determines the employment status of workers not on the basis of the number of weekly hours worked (as does the Labour Force Survey) but on how many hours throughout the year. Therefore SCF workforce data for this variable only were reported. It should be pointed out that the proportion who are not full-time/full-year would, of course, be much higher than those who are part-time according to the traditional (LFS) definition, since the former includes those who are working on a full-time basis but for only part of the year.

3 See Picot (1987) for more details on the changing industrial mix.

4 See Akyeampong (1986) for a description of the changing age and sex mix of part-time employment.

5 See Lévesque (1987) for analysis of the link between changes in the industrial structure and part-time employment growth.

6 CONCLUDING REMARKS AND POLICY IMPLICATIONS

In this paper, an attempt was made to quantify the impact of a number of demographic and structural changes on the distribution of employment income in an effort to address the declining middle hypothesis. A reading of the relevant literature pointed to a lack of empirical analysis of the declining middle phenomenon. Moreover, even in the United States, which has produced a number of quantitative efforts, few have been comprehensive enough to incorporate most factors thought to be affecting the distribution. For this reason, there is no clear consensus as to even if there is a declining middle, let alone what may be causing it. The lack of agreement could further be attributed to differences in the political stripe of the observer (interventionist or non-interventionist); divergences in the object and unit of analysis (employment or total income; individual or family); and the use of different measures of income inequality. It was the aim of the present exercise to fill the void created by previous efforts.

According to the proponents of the declining middle thesis, the middle of the income distribution is shrinking in size as many of its former occupants are moving up and down the income ladder to expand the ranks of the higher and lower income brackets. This shift in the distribution has been attributed to, variously, the

growing participation of women in the labour market; the entry of a large cohort of postwar baby boomers; the increasing level of educational attainment; the surge in popularity of lower-paid part-time work; the change in emphasis from goods-producing to service-producing employment which is said to be bipolar; and, finally, the growth in white-collar occupations. One of the chief sources of changes in the occupational mix has been technological change because, it has been said, it simultaneously favours higher-qualified and lower-skilled jobs while eliminating many middle-skilled ones, particularly of the blue-collar variety.

The first task was to determine once and for all whether or not there has been a declining middle. Using individual employment income as a measure of class (since it was both readily measurable and responsive to technological and structural forces) and a host of inequality criteria, it was found that from 1971 to 1984 there has been very little increase in income inequality. The only change of note was a roughly 14 per cent loss in work-force share experienced by the middle class. This apparent stability was surprising, given the shifts that have taken place in the labour market over the 1970s and 1980s. How could this be? The answer likely lies in the fact that the various changes have cancelled each other out, leading, in net terms, to relative overall stability.

To corroborate this statement, the direction of impact of these factors was determined. First, technological change by itself was analyzed to see if it was contributing to a loss of middle-class jobs. On the basis of a methodology that ranked industries and assigned them to three technological sectors according to the extent to which they utilized high-tech inputs, it was found that between 1971 and 1981 high-tech industries in fact created a greater proportion of middle-class jobs than the other two sectors combined. But this analysis was found to be incomplete mainly because it stopped, of necessity, in 1981 and, in addition, lacked a demographic dimension that was also important in the declining middle debate.

Therefore, an analytical tool (STANDIST) and another body of data (Survey of Consumer Finances) were used, which together permitted an investigation of the relevant questions in the declining middle debate. Standardization techniques were used to isolate the impacts of the various labour market changes -- including shifts in population shares, mean income, and income shapes -- on the distribution of employment income. The results of this analysis are summarized in Table 9. It was noted first that the impact on the polarization measure was close to zero; no further comment on this will be made. Regarding the rest, it was found that changes in the mean income and within group distribution of the sexes had, for the most part, contributed to increasing equality and middle-class size, whereas changes in the

Table 9

Summary of the Impacts[1] of Various Factors on the Distribution of Employment Income, Canada, 1971-84, 1975-84

	Time period	Dimension	Income share of middle class	Relative size of middle class	Income equality[2]	Uni-modality[3]	Summary[4]
Sex	1971-84	Composition	-	-	0(-)	0(-)	-
		Mean income	+	+	+	0(+)	+
		Shape	+	+	+	0	+
Age	1971-84	Composition	+	+	+	0(-)	+
		Mean income	0	-	0(-)	0	0
		Shape	+	+	+	0(-)	+
Education	1971-84	Composition	0(+)	0	0(+)	0(-)	+
		Mean income	+	+	+	0	+
		Shape	+	+	+	0(-)	+
Employment status	1975-84	Composition	0(-)	-	0	0(-)	-
		Mean income	0(-)	0(-)	-	0	0
		Shape	0(-)	-	0(-)	0(-)	-
Industry	1975-84	Composition	0(+)	+	0(+)	0(-)	+
		Mean income	0(-)	0(-)	0(-)	0	0
		Shape	0	+	0(-)	0(-)	0
Occupation	1975-84	Composition	0	0	0(+)	0(-)	0
		Mean income	0	0	0(-)	0	0
		Shape	0(-)	0(-)	0(+)	0(-)	0

1 An impact of "0" (zero) was assigned if the net effect on the first two indicators was 0.2 percentage points or less and that on the last two indicators, less than 0.01 percentage points. Where there was some change but of less than these thresholds, the direction is indicated in brackets.

2 As measured by the Gini coefficient; a "+" here indicates that changes in the relevant factor contributed to a more equitable distribution and vice versa for a "-".

3 As measured by W-Pol; a "+" here indicates changes in the relevant factor contributed to greater "uni-modality" (less polarization) and vice versa for "-".

4 "Averages" the impact of the various indicators.

Source Calculations based on unpublished data from the Survey of Consumer Finances, Social and Economic Studies Division, Statistics Canada.

sex composition led to a smaller middle class. Similarly, along the age dimension, shifts there have generally been favourable to income equality with only the changes in the relative mean incomes of the age groups having a moderately negative impact. As for educational attainment, standardizing by composition, mean income, and shape shows that changes there have been positive as far as middle-class size and income share as well as income equality are concerned.

Turning to non-demographic factors, shifts in emphasis toward part-time work appears to have had a negative influence on the distribution of income. On the other hand, an examination of sectoral impacts revealed a positive contribution for the industrial composition and income shapes, but a slightly negative result for shifts in the mean incomes of the different industrial sectors. Finally, changes in the population shares, mean incomes, and income distributions (shapes) of occupational groups have had almost no impact on the distribution of employment income.

In sum, if the focus is purely on shifts in labour force composition (that is, not the mean incomes and income shapes), then it can be said that the negative impact of changes in the employment status and sex appear to have been almost entirely offset by the positive influence of age, educational attainment, and industry changes. Or, cut another way, in looking only at the relative size of the middle class, the analysis shows that it was

changes in the sex composition, mean incomes of the age groups, and employment status breakdown and income distribution which were the main culprits in the net small (relative) loss of middle-class jobs; other changes in sex and age groups as well as in the educational attainment and industry of the labour force have made a positive contribution.

What are the implications of these results? For one thing, because changes in the occupational mix are an important manifestation of tech change, it is possible to make the tentative conclusion that, on the whole, technological change appears not to be eroding the middle class as contended -- a finding supported by an earlier high-tech input analysis. This analysis also shows that the so-called deindustrialization trend has generally not led to a loss of middle-class jobs, although changes in the relative mean incomes of industries have, to some extent. Similarly, it was found that changes in the age mix of the labour market have not led, as some have asserted, to a shrinking middle class. Indeed, among the changes cited and examined, only the growth in part-time employment and, to some extent, the increasing participation of women, appear to have had a dampening effect on the expansion of the middle class.

How do these findings help in formulating public policy? With regard to the demographic structure, if changes there were destroying middle-class jobs, the problem would be termed as

transitory by those who believe the large cohort of youths and women will eventually acquire experience and thus income -- thus obviating the need for market intervention on the part of government. In fact, it was found that such changes have had, on balance, a positive impact on income equality. Still, for the young, the old, and women, average incomes remained low enough to attract attention and point to the need for some supportive action in the form of training and retirement assistance.

Similarly, it was found that changes in the occupational, industrial, and technological makeup of jobs, by themselves, were not leading to the erosion of the middle class per se. This would make unnecessary such corrective policy action as artificially propping up dying manufacturing industries in an effort to stem the loss of middle-class jobs. On the other hand, the increase in part-time employment, which itself may be due partially to the growth in the service sector and the advance of technology, was found to have contributed to a depletion of the middle class. So, changes in the industrial structure and technology may indirectly be to blame. At any rate, while we can do little about the growth in part-time jobs, we can at least protect those in them, since it has been shown elsewhere that such workers appear to be discriminated against in terms of wages and benefits.

On the whole, on the basis of aggregate industry data, there are no grounds for the fears that sectoral shifts were destroying

middle-class jobs. However, as revealed in a number of isolated, but real-life examples of income skidding, industrial restructuring and technological change have led to a considerable number of manufacturing workers being forced to take cuts in income and jobs in the service sector. Adjustment is made all the more difficult by the fact that such workers are often older or without much education and thus are least prepared to find other employment, and that the dying industries are often concentrated in one particular geographic area where they are likely the sole employer. Again, while it is not suggested that bail-outs be used to keep old industries alive, it is proposed that workers adversely affected by the death or decline of such industries be granted a suitable amount of training and mobility assistance to enable them to take full advantage of new opportunities created elsewhere. The need for such aid is all the more crucial in light of the fact that the pace of technological change will likely quicken. Technological change provides overall benefits to society and to stymie it would prove deleterious. However, in embracing the new technologies, we must assure that the attendant gains be equitably distributed so that just a few do not bear the brunt of the change.

APPENDIX: SYNTHESIS OF THE DECLINING MIDDLE DEBATE

Author, year and country	Unit of observation	Income type	Measures/methods used	Years looked at	Factors considered	Is middle declining?	Causes identified
Kuttner, 1983 (U.S.)	individual	employment			mfg-serv shift; union decline; biased public policy	Yes	see "factors considered"
Steinberg, 1983 (U.S.)	family	total			mfg-serv shift; tech change; int'l competition (leading to layoffs/ income skidding); two-earner households.	Yes	see "factors considered"
Samuelson, 1983 (U.S.)	individual family	total	quintiles		feminization; mfg-serv shift; tech change; trade; recession; gov't policy	Yes	recession; gov't policy (but not industry shifts)
Thurow, 1984 (U.S.)	household	total	middle class=75-125% of median	1967, 1982	baby boom; high tech; mfg-serv shift/union/trade; recession/u-rates; female-headed households; two-earner households	Yes	all "factors considered," except baby boom
Lawnsborough, 1984 (U.S.)	family	total	*mean *quintiles		mfg-serv shift	Yes	mfg-serv shift
Lawrence, 1984 (U.S.)	individual	usual weekly earnings	*median (full-time) *middle class=$250-499 (1983$) *constant-share analysis[1]	1969, 1983	sector shift; feminization of labour force; high tech; baby boom	Yes*	baby boom - large cohort (but will be less a factor in future)

* a qualified Yes (see "Causes identified" column).

APPENDIX (cont'd)

Author, year and country	Unit of observation	Income type	Measures/methods used	Years looked at	Factors considered	Is middle declining?	Causes identified
Levitan & Carlson, 1984 (U.S.)	individual	earnings	tertiles	1970, 1979	baby boom; femininization; growing part-time element; high tech	Yes*	baby boom & femininization (but future should be brighter)
	family	total, pre-tax	tertiles	1970, 1979, 1982	single-parent families; baby boom; femininization, two-earner households; family size; singles	Yes	see "factors considered"
	family	total, after-tax	tertiles	1981	taxes	No	
AFL/CIO, 1984 (U.S.)	individual	earnings	*middle-class=mean ± 20% *job growth by class & by industry	1960-75	sfg-serv shift, technology	Yes	sfg-serv shift
Madoff, 1984 (U.S.)	firm	wages & salaries	middle-class=mean ± 40%	1984	high tech (computer manufacturers)	No	
	individual	hourly earnings	variance in logarithm	1973, 1984		No	
		wages & salaries	mean/quintiles job growth	1973			
Blackburn & Bloom, 1985 (U.S.)	family	total income	five classes vis-à-vis median: less than 60%; 60-100%; 100-160%; 160-225%; 225%+	1969, 1983	regional shifts; family size; two-earner households; baby boom; skill/education; sfg-serv shift; business cycle/unemployment rate	Yes*	two-earner households & baby boom (but will be less affected in future);

APPENDIX (cont'd)

Author, year and country	Unit of observation	Income type	Measures/methods used	Years looked at	Factors considered	Is middle declining?	Causes identified
Krulwich, 1985 (U.S.)	occupation	skills	skill classes based on education and training	1982-95		No	
Rosenthal, 1985 (U.S.)	occupation	weekly earnings	tertiles	1973, 1982	•occupational changes	No	
					•occupational changes and earnings structure changes	No	
					•mfg-serv shift	No	
					•occupational changes; growing part-time element	No	
		hourly earnings	employment growth & share		mfg decline; high tech; occupational changes; goods-services shift; public policy	No	
Harrington & Levinson, 1985 (U.S.)	individual	wages	tertiles	1977	high tech (semi-conductor industry)	Yes	
Belous, et al. 1985 (U.S.)	family	total income	•middle class=middle 3 quintiles •Gini coefficient •regression on explanatory variables[2]	1947-84	mfg-serv shift; cycle-unemployment rate; productivity growth; single-parent families (divorce rate); femininization; baby boom; high tech/ occupational shifts	Yes	unemployment rate; divorce rate (social and economic factors)
McMahon & Tschetter, 1986 (U.S.)	occupation & individual	usual weekly earnings	tertiles	1977, 1982	baby boomers (little experience, large cohort); femininization; goods-serv shift; business cycle; organizational changes; growing part-time element	Yes	maybe the suggested causes

APPENDIX (cont'd)

Author, year and country	Unit of observation	Income type	Measures/methods used	Years looked at	Factors considered	Is middle declining?	Causes identified
Bradbury, 1986 (U.S.)	family	total income	•median •middle class=$20K-50K (1984 $) •shift-share analysis[3]	1973-84	region; decreasing family size; baby boom; single-parent families; femininization	Yes	not demographic changes, so must be economic changes
Osberg, 1986 (Canada)	individual	employment income	•mean •quintiles •Gini coefficient •coefficient of variation •Theil index	1981	occupational shifts	No	
Wolfson, 1986 (Canada)	family	total income	•mean •quintiles •coefficient of variation •Gini coefficient •exponential measure •standardization[4]	1965-83	age (baby boomers); family composition (two-earners, singles, single-parent); labour force participation; income composition; inflation/ unemployment rate	No overall	"social" factors like changing age & family composition •standardization
Castro, 1986 (U.S.)	family	total income	•mean •middle class=$15K-25K	1970-85		Yes, but most have gone to upper class	

APPENDIX (cont'd)

Author, year and country	Unit of observation	Income type	Measures/methods used	Years looked at	Factors considered	Is middle declining?	Causes identified
Cook, 1987 (Canada)	family	total income	quintiles: lowest 40%; middle 40%; upper 20%	1950-85		little evidence but composition has changed	families have risen and fallen out of the middle class
Thurow, 1987 (U.S.)	family	total income	quintiles: top 20% vs. bottom 60%	1947-85	tax/social policies	top increasing, bottom decreasing	
	individual	total income, incl. return on wealth	deciles: top 10%; next 30%; bottom 60%;	1969-82	increasing capital-income share		
	individual	total net worth	percentiles: top 2% vs. bottom 50%	1985	increasing capital-income share	No, but top declining	
	male	earnings; full-time earnings	classes vis à vis median: less than 75%; 75%-125%; 125%+	1976-85	slow growth in productivity/output; femininization; baby boom; international competition; lack of proper training/education; lack of capital investment; lack of R&D spending	Yes	lack of investment in education and technology; single-parent, impoverished female-headed families
	workers	labour compensation per hour	growth rate	1960-69		slowdown	
	earner	annual earnings	distribution of jobs created, by: less than $10K; 10-25K; 25K +	1979-85		Yes; increase in bottom, decrease in top	

APPENDIX (cont'd)

Author, year and country	Unit of observation	Income type	Measures/methods used	Years looked at	Factors considered	Is middle declining?	Causes identified
Thurow (cont'd)	earner	annual earnings	distribution of export/import-competing inds. vs economy	1969-83	international trade deficit	Yes	trade inds more equal but dropping in significance; balance of payments deficit
Levy, 1987 (U.S.)	family	total income	•median •Quintiles: top 20%; mid. 60%; bottom 20%	1947-84	declining incomes; feminization/ 2-earner families; singles; birth rate fell; inflation/ recession; single parent families	No, but composition of middle class changing; earning power and class mobility falling	inflation has helped the elderly on indexed pensions but hurt real wages and income growth
Blackburn & Bloom, 1987 (U.S.)	economic family	•total income •total earnings •equivalent income	•Gini coefficient •mean logarithmic deviation •coefficient of variation •five classes vis-à-vis median (see: Blackburn & Bloom, 1984)	1967-85	"tech change", indirectly through the labour market participation of members and size/composition of family	Yes	"tech change"
	worker	earnings	same as above	1967-85	"tech change"; sex shifts; sectoral shifts	No	

1 Decomposition of difference between actual middle-class job growth and the hypothetical growth had middle-class jobs increased with total employment.

2 Explains inter-temporal changes in Gini coefficient and middle-class income share in terms of variables in question.

3 Attributes portion of middle-class decline to a particular factor by holding all other variables constant over period in question.

4 Measure the impact on the distribution of holding constant a particular variable or variables in question.

Source See Bibliography of this paper for full citations.

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